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Revision Number 18

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name **4,4'- METHYLENE DIANILINE**

Other means of identification

Product Code 3602800
CAS Number 101-77-9
Formula C13H14N2
Synonyms Benzamine, 4,4'- ,Methylenebis- ; 4,4'-Methylene Dianiline
UN-No UN2651

Recommended use of the chemical and restrictions on use

Recommended Use Coatings
Uses advised against Do not use where contact with food or drinking water is possible. Avoid prolonged contact with eyes, skin, and clothing.

Details of the supplier of the safety data sheet

Supplier Address ACETO US, LLC
4 Tri Harbor Court
Port Washington, NY 11050-4661
Phone: (516) 627-6000
Fax: (516) 627-6093
Email: aceto@aceto.com

Emergency telephone number(s)

ChemTrec: 1-800-424-9300 Outside of the United States: 1-703-527-3887

2. HAZARDS IDENTIFICATION

Classification

Acute toxicity - Oral	Category 4
Acute toxicity - Dermal	Category 2
Acute toxicity - Inhalation (Dusts/Mists)	Category 3
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 1
Specific target organ toxicity (repeated exposure)	Category 2
Chronic aquatic toxicity	Category 2
Acute aquatic toxicity	Category 3

Label elements

Emergency Overview

Signal Word**DANGER****Hazard statements**

Harmful if swallowed
 Fatal in contact with skin
 Toxic if inhaled
 May cause an allergic skin reaction
 Suspected of causing genetic defects
 May cause cancer
 Causes damage to organs
 May cause damage to organs through prolonged or repeated exposure
 Toxic to aquatic life with long lasting effects

**Appearance**

White or Pale Yellow Crystal

Physical State

Solid

Odor

No information available

Precautionary Statements - Prevention

Obtain special instructions before use
 Do not handle until all safety precautions have been read and understood
 Use personal protective equipment as required
 Wash face, hands and any exposed skin thoroughly after handling
 Do not eat, drink or smoke when using this product
 Do not get in eyes, on skin, or on clothing
 Contaminated work clothing should not be allowed out of the workplace
 Wear protective gloves
 Do not breathe dust/fume/gas/mist/vapors/spray

Precautionary Statements - Response

IF exposed: Call a POISON CENTER or doctor/physician
 Immediately call a POISON CENTER or doctor/physician
 IF ON SKIN: Gently wash with plenty of soap and water
 Remove/Take off immediately all contaminated clothing
 Wash contaminated clothing before reuse
 If skin irritation or rash occurs: Get medical advice/attention
 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
 Rinse mouth

Precautionary Statements - Storage

Store locked up

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None known

Other Information

No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Benzamine, 4,4'- ,Methylenebis- ; 4,4'-Methylene Dianiline

Formula C13H14N2

Chemical name	CAS No.	Weight-%	North American Hazard Indicator
4,4'- Diaminodiphenyl Methane	101-77-9	100	1 0.1 ppm TWA

4. FIRST AID MEASURES

First Aid Measures

General Advice Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Wash contaminated clothing before reuse. Call a physician immediately.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a physician or poison control center immediately.

Ingestion Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

Self-Protection of the First Aider Use personal protective equipment as required. Avoid contact with eyes, skin and clothing.

Most important symptoms and effects, both acute and delayed

Signs and Symptoms No information available.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water spray. Alcohol-resistant foam. Dry chemical. Carbon dioxide (CO₂).

Unsuitable Extinguishing Media No information available.

Hazardous Combustion Products Carbon monoxide. Carbon dioxide (CO₂). Nitrogen oxides.

Explosion Data Not available

Sensitivity to mechanical impact Not available.

Sensitivity to static discharge Not available.

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Protective Equipment and Precautions for Firefighters

In the event of fire, wear self contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures**Personal Precautions**

Evacuate personnel to safe areas. Ensure adequate ventilation. Use personal protective equipment as required. Avoid contact with eyes, skin and clothing. Wear disposable coveralls and discard after use. In case of insufficient ventilation, wear suitable respiratory equipment.

Environmental Precautions

Local authorities should be advised if significant spillages cannot be contained. Do not flush into surface water or sanitary sewer system. Prevent product from entering drains. Do not allow into any sewer, on the ground or into any body of water. Should not be released into the environment.

Methods and material for containment and cleaning up**Methods for Clean-up**

Evacuate personnel to safe areas. Sweep up and shovel into suitable containers for disposal. Avoid dust formation. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling**Handling**

Use only in an area equipped with a safety shower. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation. Use only in well-ventilated areas. Do not breathe vapors/dust. Avoid contact with eyes, skin and clothing. Avoid repeated exposure.

Conditions for safe storage, including any incompatibilities**Storage**

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly labeled containers. Protect from light.

Incompatible Materials

Incompatible with oxidizing agents. Acids. Acid chlorides. Acid anhydrides.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
4,4'- Diaminodiphenyl Methane 101-77-9	0.1 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	5 ppb Action Level 10 ppb TWA 100 ppb STEL STEL: 100 ppb see 29 CFR 1910.1050	-

Appropriate engineering controls**Engineering Controls**

Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment**Eye/Face Protection**

Tight sealing safety goggles.

Skin and body protection

Impervious gloves. Gloves must be inspected prior to use. Use proper glove removal

technique (without touching glove's outer surface) to avoid skin contact with this product. They type of protective equipment must be selected according to the concentration and amount of dangerous substance at the specific workplace.

Respiratory Protection

In case of insufficient ventilation, wear suitable respiratory equipment.

General Hygiene Considerations

General industrial hygiene practice. When using, do not eat, drink or smoke. Remove and wash contaminated clothing before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	White or Pale Yellow Crystal
Physical State	Solid
Odor	No information available
Odor Threshold	No information available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	No Data Available	
Melting point / Freezing point	88-94 °C	Literary Reference
Boiling point / boiling range	398 - 399 °C	
Flash Point	221 °C	CC (closed cup)
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air	No information available	
Upper flammability limit	No information available	
Lower flammability limit	Not available	
Vapor Pressure	0.12mm Hg @ 152 Deg. C	
Vapor Density	6.8 g/l	
Specific Gravity	No information available	
Water Solubility	1.25 g/L @20°C	
Solubility in other solvents	No information available	
Partition coefficient: n-octanol/water	Not available	
Autoignition temperature °C	261 °C	Estimated
Decomposition temperature	No Data Available	
Kinematic Viscosity	No information available	
Dynamic Viscosity	Not available	
Explosive Properties	No information available	
Oxidizing Properties	No information available	

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC content	No Data Available
Liquid Density	No information available
Bulk density	No information available
Corrosion characteristics	No information available

10. STABILITY AND REACTIVITY

Reactivity	Not applicable.
Chemical Stability	Stable under recommended storage conditions
Conditions to Avoid	Heat, flames and sparks. Protect from light.
Incompatible Materials	Incompatible with oxidizing agents. Acids. Acid chlorides. Acid anhydrides.

Hazardous Decomposition ProductsCarbon monoxide. Carbon dioxide (CO₂). Nitrogen oxides (NO_x).**Possibility of Hazardous Reactions**

None under normal processing

11. TOXICOLOGICAL INFORMATION**Product Information**

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
4,4'- Diaminodiphenyl Methane	= 335 mg/kg (Rat)	= 200 mg/kg (Rabbit) = 750 mg/kg (Rat)	> 0.85 mg/L (Rat) 4 h

The following values are calculated based on chapter 3.1 of the GHS document**Information on likely routes of exposure**

Eyes	Irritating to eyes. Avoid contact with eyes.
Skin	Toxic in contact with skin. May be fatal if absorbed through skin. Irritating to skin. May cause allergic skin reaction. Avoid contact with skin.
Inhalation	Toxic by inhalation. Avoid breathing dust.
Ingestion	Harmful if swallowed. Do not take internally.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen. May cause cancer.

Chemical name	ACGIH	IARC	NTP	OSHA
4,4'- Diaminodiphenyl Methane 101-77-9	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans	Group 2B	Reasonably Anticipated To Be A Human Carcinogen	Present

Serious eye damage/irritation	No information available.
Skin Corrosion/Irritation	No information available.
Sensitization	May cause allergic skin reaction.
Reproductive Effects	No information available.
Mutagenic Effects	Suspected of causing genetic defects.
Developmental Effects	No information available.
STOT - single exposure	No information available.
STOT - Repeated Exposure	May cause damage to organs through prolonged or repeated exposure.
Chronic Toxicity	Avoid repeated exposure. Contains a known or suspected mutagen. May cause heritable genetic damage. May cause cancer. California Proposition 65.

Aspiration Hazard No information available.

12. ECOLOGICAL INFORMATION

This product contains a chemical which is listed as a marine pollutant according to DOT.

Ecotoxicity

Toxic to aquatic life with long lasting effects
Avoid release to the environment

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
4,4'- Diaminodiphenyl Methane 101-77-9	21: 72 h Desmodemus subspicatus mg/L EC50	42: 96 h Brachydanio rerio mg/L LC50 static	= 5.99 mg/L EC50 Photobacterium phosphoreum 5 min = 6.57 mg/L EC50 Photobacterium phosphoreum 15 min = 6.57 mg/L EC50 Photobacterium phosphoreum 30 min = 6.6 mg/L EC50 Photobacterium phosphoreum 1 h	-

Persistence/Degradability No information available.

Bioaccumulation/Accumulation No information available.

Mobility in Soil No information available.

Chemical name	log Pow =
4,4'- Diaminodiphenyl Methane 101-77-9	1.46

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal Methods Contact waste disposal services. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of in accordance with local regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION

DOT

UN-No	UN2651
Proper Shipping Name	4,4'-DIAMINODIPHENYL METHANE
Hazard class	6.1
Packing Group	III
Reportable Quantity (RQ)	4,4'-Methylenedianiline: RQ kg= 4.54
Description	UN2651,4,4'-Diaminodiphenyl methane ,6.1,PG III,RQ kg= 4.54, Marine Pollutant
Emergency Response Guide	153

Number**TDG**

UN-No UN2651
Proper Shipping Name 4,4'-Diaminodiphenylmethane
Hazard class 6.1
Packing Group III
Marine Pollutant This product contains a chemical which is listed as a marine pollutant according to TDG.
Description UN2651, 4,4'-Diaminodiphenylmethane, 6.1, III, RQ kg= 4.54, Marine Pollutant

MEX

UN-No UN2651
Proper Shipping Name 4,4'-Diaminodiphenylmethane
Hazard class 6.1
Packing Group III
Description UN2651, 4,4'-Diaminodiphenylmethane, 6.1, III, RQ kg= 4.54, Marine Pollutant

ICAO

UN-No UN2651
Proper Shipping Name 4,4'-Diaminodiphenylmethane
Hazard class 6.1
Packing Group III
Description UN2651, 4,4'-Diaminodiphenylmethane, 6.1, III, RQ kg= 4.54, Marine Pollutant

IATA

UN number UN2651
Proper Shipping Name 4,4'-Diaminodiphenylmethane
Transport hazard class(es) 6.1
Packing Group III
Description UN2651, 4,4'-Diaminodiphenylmethane, 6.1, III, RQ kg= 4.54, Marine Pollutant

IMDG

UN number UN2651
Proper Shipping Name 4,4'-Diaminodiphenylmethane
Transport hazard class(es) 6.1
Subsidiary Class P
Packing Group III
EmS No. F-A, S-A
Marine Pollutant This product contains a chemical which is listed as a marine pollutant according to IMDG/IMO
Description UN2651, 4,4'-Diaminodiphenylmethane, 6.1 (P), III, RQ kg= 4.54, Marine Pollutant

RID

UN-No UN2651
Proper Shipping Name 4,4'-Diaminodiphenylmethane
Transport hazard class(es) 6.1
Packing Group III
Classification Code T2
Description UN2651, 4,4'-Diaminodiphenylmethane, 6.1, III, RQ kg= 4.54, Marine Pollutant
ADR/RID-Labels 6.1

ADR

UN-No UN2651
Proper Shipping Name 4,4'-Diaminodiphenylmethane
Hazard Class 6.1
Packing Group III
Classification Code T2
Tunnel Restriction Code (E)
Description UN2651, 4,4'-Diaminodiphenylmethane, 6.1, III, RQ kg= 4.54, Marine Pollutant
Labels 6.1

ADN

Proper Shipping Name	4,4'-Diaminodiphenylmethane
Transport hazard class(es)	6.1
Packing Group	III
Classification Code	T2
Special Provisions	802
Description	UN2651, 4,4'-Diaminodiphenylmethane, 6.1, III, RQ kg= 4.54, Marine Pollutant
Hazard label(s)	6.1
Limited Quantity	5 kg

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
Canada (DSL)	Complies
EU (EINECS)	Complies
EU (ELINCS)	Does not comply
Japan (ENCS)	Complies
China (IECSC)	Complies
Korea (KECL)	Complies
Philippines (PICCS)	Complies
Australia (AICS)	Complies
Mexico INV	Complies
Taiwan INV	Complies

Chemical name	U.S.A. (TSCA)	Canada (DSL)	EU (EINECS)	EU (ELINCS)	
4,4'- Diaminodiphenyl Methane	Present	Present	X	-	
Component	Japan (ENCS)	China (IECSC)	Korea (KECL)	Philippines (PICCS)	Australia (AICS)
-	Present (4)-40	Present	Present	Present	Present
Chemical name	Mexico INV		Taiwan INV		
4,4'- Diaminodiphenyl Methane 101-77-9	Present		Present		

Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Component	SARA 313 - Threshold Values
4,4'- Diaminodiphenyl Methane 101-77-9 (100)	0.1 % de minimis concentration

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following HAPs:

Chemical name	CAS No.	HAPS data
4,4'- Diaminodiphenyl Methane	101-77-9	Present (listed under 4,4-Methylenedianiline)

VOC content

No Data Available

Chemical name	CAS No.	VOCs
4,4'- Diaminodiphenyl Methane	101-77-9	Present

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
4,4'- Diaminodiphenyl Methane 101-77-9	-	-	-	-

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	CERCLA/SARA Hazardous Substances	CERCLA/SARA RQ	RQ
4,4'- Diaminodiphenyl Methane 101-77-9	10 lb final RQ; 4.54 kg final RQ	-	10 lb final RQ; 4.54 kg final RQ

State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical name	CAS No.	California Proposition 65	Type
4,4'- Diaminodiphenyl Methane	101-77-9	Carcinogen 0.4 µg/day NSRL	carcinogen, initial date 1/1/88

State Right-to-Know

This product contains the following State Right-to-Know chemicals:

Chemical name	New Jersey	Massachusetts	Illinois	Rhode Island	Pennsylvania
4,4'- Diaminodiphenyl Methane 101-77-9	sn 1256	Carcinogen; Extraordinarily hazardous	Present	Toxic (skin)	Environmental hazard

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

Canada

WHMIS Statement

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

16. OTHER INFORMATION**NFPA**

Health 2

Flammability 1

Instability 0

Physical Hazard 0

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Not available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet