

Material Safety Data Sheet

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Version 1.4

According to 91/155/EEC

1 - Product and Company Information

Product Name 4,4'-MDI
 Product Number 33428

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 United Kingdom

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2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
4,4'-METHYLENEBIS(PHENYL ISOCYANATE)	101-68-8	202-966-0	615-005-00-9

Formula C15H10N2O2
 Molecular Weight 250.26 AMU
 Synonyms Benzene, 1,1'-methylenebis(4-isocyanato- (9CI) *
 Bis(p-isocyanatophenyl)methane *
 Bis(1,4-isocyanatophenyl)methane *
 Bis(4-isocyanatophenyl)methane * Caradate 30 *
 Desmodur 44 * Difenylmethaan-dissocyanat
 (Dutch) * Difenil-metan-diisocianato (Italian) *
 4-4'-Diisocyanate de diphenylmethane (French) *
 4,4'-Diisocyanatodiphenylmethane *
 Diphenylmethan-4,4'-diisocyanat (German) *
 Diphenyl methane diisocyanate *
 p,p'-Diphenylmethane diisocyanate *
 4,4'-Diphenylmethane diisocyanate *
 Diphenylmethane 4,4'-diisocyanate *
 Diphenylmethane diisocyanate (ACGIH:OSHA) *
 Hylene M50 * Isonate * Isonate 125M * Isonate
 125 MF * MDI (OSHA) *
 Methylenebis(4-isocyanatobenzene) *
 1,1'-Methylenebis(4-isocyanatobenzene) *
 Methylenebis(p-phenylene isocyanate) *
 Methylenebis(4-phenylene isocyanate) *
 p,p'-Methylenebis(phenyl isocyanate) *
 Methylenebis(p-phenyl isocyanate) *
 Methylenebis(4-phenyl isocyanate) *

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT

Harmful by inhalation. Irritating to eyes, respiratory system and skin. May cause sensitization by inhalation and skin contact.

4 - First Aid Measures

AFTER INHALATION

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

AFTER SKIN CONTACT

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

AFTER EYE CONTACT

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION

Do not induce vomiting. If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

SPECIAL RISKS

Specific Hazard(s): Emits toxic fumes under fire conditions.
Explosion Hazards: Container explosion may occur under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING

Directions for Safe Handling: Do not breathe dust. Do not get in eyes, on skin, on clothing.

STORAGE

Conditions of Storage: Keep tightly closed. Store under nitrogen. Store at 2-8°C

SPECIAL REQUIREMENTS: Store under inert gas. Moisture sensitive.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS

Safety shower and eye bath. Use only in a chemical fume hood.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Remove and wash contaminated clothing promptly.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	0.05 MG/M3
Poland		NDSCh	-
Poland		NDSP	0.2 MG/M3

EXPOSURE LIMITS - DENMARK

Source	Type	Value
OEL	TWA	0.05 mg/m3
		0.005 ppm

EXPOSURE LIMITS - GERMANY

Source	Type	Value
TRGS 900	OEL	0.05 mg/m3
		0.005 ppm

Remarks: =1=

Remarks: 29

EXPOSURE LIMITS - NORWAY

Source	Type	Value
	OEL	0.05 mg/m3
		0.005 ppm

Remarks: A 3)

EXPOSURE LIMITS - SWEDEN

Source	Type	Value
	LLV (Level)	0.05 mg/m3
		0.005 ppm

Remarks: S

EXPOSURE LIMITS - UNITED KINGDOM

Source	Type	Value
OEL	TWA	0.02MG(NCO)/M3
OEL	STEL	0.07 mg(NCO)/m3

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.

Hand Protection: Compatible chemical-resistant gloves.

Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	200 °C	5 mmHg
MP/MP Range	42.0 - 44.0 °C	
Flash Point	113 °C	Method: closed cup

Flammability	N/A
Autoignition Temp	N/A
Oxidizing Properties	N/A
Explosive Properties	N/A
Explosion Limits	N/A
Vapor Pressure	N/A
SG/Density	1.18 g/cm3
Partition Coefficient	N/A
Viscosity	N/A
Vapor Density	N/A
Saturated Vapor Conc.	N/A
Evaporation Rate	N/A
Bulk Density	N/A
Decomposition Temp.	N/A
Solvent Content	N/A
Water Content	N/A
Surface Tension	N/A
Conductivity	N/A
Miscellaneous Data	N/A
Solubility	N/A

10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Water, Amines, Strong bases, Alcohols.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Nitrogen oxides, Hydrogen cyanide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: NQ9350000

ACUTE TOXICITY

LD50

Oral

Rat

4,700 mg/kg

LC50

Inhalation

Rat

0.49 MG/L

4 H

LD50

Oral

Rat

9200 mg/kg

Remarks: Nutritional and Gross Metabolic:Changes in:Body temperature decrease. Behavioral:Ataxia. Behavioral:Somnolence (general depressed activity).

LC50

Inhalation

Rat

178 mg/m3

LD50
Oral
Mouse
2200 mg/kg

IRRITATION DATA

Skin
Rabbit
500 mg
24H

Eyes
Rabbit
100 mg
Remarks: Moderate irritation effect

SENSITIZATION

Sensitization: Overexposure can result in development of isocyanate sensitization. Subsequent exposure to isocyanates well below the TLV or to other irritants such as cold air or dust, may trigger asthma-like symptoms including tightness in the chest, coughing, wheezing, and shortness of breath. Sensitization can be temporary or permanent. May cause allergic respiratory and skin reactions

SIGNS AND SYMPTOMS OF EXPOSURE

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Pulmonary edema. Effects may be delayed.

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.
Skin Absorption: Harmful if absorbed through skin.
Eye Contact: Lachrymator. Causes eye irritation.
Inhalation: Material is irritating to mucous membranes and upper respiratory tract. Harmful if inhaled.
Ingestion: Harmful if swallowed.

TARGET ORGAN INFORMATION

Lungs.

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC CARCINOGEN LIST

Rating: Group 3

CHRONIC EXPOSURE - MUTAGEN

Result: Laboratory experiments have shown mutagenic effects.

Human
20 PPB/15M-C
Inhalation
DNA damage

Human
540 MG/L
Cell Type: lymphocyte

Cytogenetic analysis

Human
2170 MG/L
Cell Type: lymphocyte
Sister chromatid exchange

Rat
2 MG/M3/52W-I
Inhalation
DNA

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 9 MG/M3/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Maternal Effects: Other effects.

12 - Ecological Information

ECOTOXICOLOGICAL EFFECTS

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 0.35 mg/l

Test Type: IC50 Algae
Time: 72 h
Value: 1.5 mg/l

13 - Disposal Considerations

SUBSTANCE DISPOSAL

Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR

UN#: 2811
Class: 6.1
PG: II
Proper Shipping Name: Toxic solid, organic, n.o.s.

IMDG

UN#: 2811
Class: 6.1
PG: II
Proper Shipping Name: Toxic solid, organic, n.o.s.
Marine Pollutant: No
Severe Marine Pollutant: No
Technical Name: Required

IATA

UN#: 2811
Class: 6.1
PG: II

Proper Shipping Name: Toxic solid, organic, n.o.s.
Inhalation Packing Group I: No
Technical Name: Required

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

ANNEX I INDEX NUMBER: 615-005-00-9

NOTA: C, 2

INDICATION OF DANGER: Xn

Harmful.

R-PHRASES: 20-36/37/38-42/43

Harmful by inhalation. Irritating to eyes, respiratory system and skin. May cause sensitization by inhalation and skin contact.

S-PHRASES: 23-36/37-45

Do not breathe vapor. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

COUNTRY SPECIFIC INFORMATION

Germany

WGK: 1

ID-Number: 635

KBwS-Decision

16 - Other Information

WARRANTY

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. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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