

## Material Safety Data Sheet

Date Printed: 14/DEC/2004

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Version 1.2

According to 91/155/EEC

## 1 - Product and Company Information

Product Name	4,4'-METHYLENEBIS(PHENYL ISOCYANATE), 98 %
Product Number	256439
Company	Sigma-Aldrich Pte Ltd #08-01 Citilink Warehouse Singapore 118529
Technical Phone #	65 271 1089
Fax	65 271 1571

## 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

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#### 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.

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### 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.

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### 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.

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### 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.

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### 8 - Exposure Controls / Personal Protection

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## 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: Government approved respirator.

Hand Protection: Compatible chemical-resistant gloves.

Eye Protection: Chemical safety goggles.

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## 9 - Physical and Chemical Properties

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Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	200 °C	5 mmHg
MP/MP Range	42 - 44 °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

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## 10 - Stability and Reactivity

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### 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

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## 11 - Toxicological Information

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

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: May cause allergic respiratory and skin reactions  
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.

## 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: Causes eye irritation. Lachrymator.  
Inhalation: Harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.  
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

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#### CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

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

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#### 12 - Ecological Information

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##### 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

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#### 13 - Disposal Considerations

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##### SUBSTANCE DISPOSAL

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

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#### 14 - Transport Information

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##### RID/ADR

Non-hazardous for road transport.

##### IMDG

Non-hazardous for sea transport.

##### IATA

Non-hazardous for air transport.

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#### 15 - Regulatory Information

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##### 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

SWITZERLAND

SWISS POISON CLASS: 3

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## 16 - Other Information

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### 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 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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