SECTION 1: CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Catalog No. L10867

Product Name:	**4-Methyl-m-phenylene diisocyanate, 98%**
Synonyms:	Toluene-2,4-diisocyanate
Manufacturer/Supplier Name:	Alfa Aesar - A Johnson Matthey Company
Address:	30 Bond St. Ward Hill, MA 01835
Business Phone:	978-521-6300
Business Fax:	978-521-6350
For information in North America, call:	978-521-6300

CHEMTREC Numbers:

For emergencies in the US, call CHEMTREC: 800-424-9300

For emergencies outside US, call INTERNATIONAL: (703)527-3887

For Nonemergency, call: (800)262-8200

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SECTION 2 : COMPOSITION, INFORMATION ON INGREDIENTS

Catalog No. L10867

Chemical Name	4–Methyl–m–phenylene diisocyanate
CAS#	584-84-9
% Weight (Typical)	98

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SECTION 3 : HAZARDS IDENTIFICATION

Catalog No. L10867

Emergency Overview: Highly toxic. Water reactive. Sensitizer. Suspect carcinogen. Mutation data. Irritant. Lachrymatory. Environmental Hazard.

4–Methyl–m–phenylene diisocyanate:

Route of Exposure:	Eyes. Skin. Inhalation.
Potential Health Effects:	
Eye Contact:	Can cause severe eye irritation.
Skin Contact:	Possible skin sensitiser. May cause severe dematitis in susceptible individuals.
Inhalation:	Very toxic by inhalation. Vapor and aerosol may cause severe irritation of the respiratory tract, inflammation of the lungs and pulmonary edema (fluid accumulation). Possible inhalation sensitiser. Repeated or prolonged exposure to low concentrations may
Ingestion:	No data
Target Organs:	Eyes. Skin. Respiratory system. Cardiovascular.

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SECTION 4 : FIRST AID MEASURES

Catalog No. L10867

Eye Contact:	Immediately flush eyes with plenty of water for at least 20 minutes. Assure adequate flushing of the eyes by separating the eyelids with fingers. Get immediate medical attention if irritation persists, or symptoms of overexposure become apparent.
Skin Contact:	Immediately wash skin with plenty of water for at least 20 minutes, while removing contaminated clothing and shoes. Get medical attention especially, if irritation develops, persists, or symptoms of overexposure become apparent.
Inhalation:	Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Keep warm. Get immediate medical attention.
Ingestion:	If swallowed, call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. Do not induce vomiting unless instructed by medical personnel. Get medical attention.

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SECTION 5 : FIRE FIGHTING MEASURES

Catalog No. L10867

Flash Point:	132°C (269.6°F)
Upper Flammable or Explosive Limit:	9.5 vol %
Lower Flammable or Explosive Limit:	0.9 vol %
Auto Ignition Temperature:	620°C (1148°F)
Extinguishing Media:	Use dry powder or carbon dioxide when fighting a fire involving this material.
Unsuitable Media:	Water extinguishers are not recommended.
Protective Equipment:	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.

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SECTION 6 : ACCIDENTAL RELEASE MEASURES

Catalog No. L10867

Personal Precautions:	Use proper personal protective equipment as listed in section 8.
Spill Cleanup Measures:	Clean up spills immediately, observing precautions in the Protective Equipment section. Absorb spill with dry inert material such as dry sand, earth, or vermiculite, then place in suitable container. Do not expose spill to water. Refer to section 13 for proper disposal.
Environmental Precautions:	Do not allow material to enter drains or streams.

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SECTION 7 : HANDLING and STORAGE

Catalog No. L10867

Handling:	This product should be handled only by, or under the close supervision of, those properly qualified in the handling and use of potentially hazardous chemicals, who should take into account the fire, health and chemical hazard data. It should always be handled in an efficient fume hood or equivalent system. The user should consider that the toxicological and physiological properties of many compounds are not yet well determined and that new hazardous products may arise from reactions between chemicals. Care should be taken to prevent any chemical from coming into contact with the skin or eyes and from contaminating personal clothing.
Storage:	Store in a cold, below 5 degrees celcius, dry, well ventilated area away from sources of heat and incompatible substances. Keep container tightly closed and cold when not in use. Product is moisture sensitive.
Hygiene Practices:	Wash thoroughly after handling. Avoid contact with eyes and skin. Avoid inhaling vapor or mist.

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SECTION 8 : EXPOSURE CONTROLS, PERSONAL PROTECTION

Catalog No. L10867

Guideline Type:	ACGIH TLV-STEL
Guideline Information:	0.02 ppm 0.14 mg/m3 Sensitizer.
Guideline Type:	OSHA PEL-STEL
Guideline Information:	0.02 ppm 0.14 mg/m3 Ceiling.
Guideline Type:	NIOSH REL-STEL
Guideline Information:	Lowest feasible concentration.
Guideline Type:	ACGIH TLV-TWA
Guideline Information:	0.005 ppm 0.036 mg/m3

Engineering Controls:	Use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Where such systems are not effective wear suitable personal protective equipment, which performs satisfactorily and meets OSHA or other recognized standards. Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.
Skin Protection Description:	Wear suitable protective clothing to prevent contact with skin.
Hand Protection Description:	Wear appropriate protective gloves. Consult glove manufacturers for glove permeability data.
Eye/Face Protection:	Wear appropriate protective glasses or splash goggles as described by 29 CFR 1910.133, OSHA eye and face protection regulation, or the European standard EN 166.
Respiratory Protection:	A NIOSH approved air-purifying respirator with an appropriate cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited to airborne concentrations that are typically within 10 times the exposure limit. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHAs 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirators use.
Other Protective:	Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Ingredient Guidelines

Ingredient: 4–Methyl–m–phenylene diisocyanate

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SECTION 9 : PHYSICAL and CHEMICAL PROPERTIES

Catalog No. L10867

Physical State/Appearance:	Liquid
Color:	Colorless
Odor:	Pungent
Vapor Pressure:	0.01 mbar @ 20°C (68°F)
Vapor Density:	6
Flash Point:	132°C (269.6°F)
Auto Ignition Temperature:	620°C (1148°F)
Upper Explosive Limit:	9.5 vol %
Lower Explosive Limit:	0.9 vol %
Boiling Point:	115-120°C (239-248°F) /10mm
Melting Point:	20-22°C (68-71.6°F)
Solubility in Water:	Hydrolyses
Density:	1.23
Evaporation Point:	<1 (ether=1)
Dynamic Viscosity:	3.769 mPa.s @ 29.4°C (84.92°F)
Molecular Formula:	$C_9H_6N_2O_2$
Molecular Weight:	174.16

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SECTION 10 : STABILITY and REACTIVITY

Catalog No. L10867

Conditions to Avoid:	High temperatures, flames and sparks. Humidity.
Incompatibilities with Other Materials:	Strong oxidizing agents. Reducing agents. Amines. Alcohols. Water.
Possible Decomposition Product:	Carbon monoxide. Hydrogen cyanide, oxides of nitrogen.

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SECTION 11 : TOXICOLOGICAL INFORMATION

Catalog No. L10867

4–Methyl–m–phenylene diisocyanate :

RTECS Number:	CZ6300000
Eye Effect:	Eye - rabbit: 100 mg; Severe irritation. (RTECS)
Skin Effects:	Skin - rabbit LD50: >16 mL/kg (> 19.68 gm/kg) (RTECS)
Ingestion Effects:	Oral - rat LD50: 5800 mg/kg [Gastrointestinal - other changes] (RTECS)
Inhalation Effects:	Inhalation - rat LC50: 14 ppm/4H [Sense Organs and Special Senses (Eye) - lacrimation Behavioral - excitement Lungs, Thorax, or Respiration - dyspnea] (RTECS); Inhalation -mouse LC50: 10 ppm/4H [Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi Lungs, Thorax, or Respiration - changes in pulmonary vascular resistance] (RTECS); Inhalation -rabbit LC50: 11 ppm/4H [Behavioral - excitement Lungs, Thorax, or Respiration - dyspnea Gastrointestinal - changes in structure or function of salivary glands] (RTECS); Inhalation -guinea pig LC50: 13 ppm/4H [Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi Lungs, Thorax, or Respiration - changes in pulmonary vascular resistance Lungs, Thorax, or Respiration - pleural effusion] (RTECS); Inhalation -Human TCLo: 500 ppb [Sense Organs and Special Senses (Olfaction) - effect, not otherwise specified Lungs, Thorax, or Respiration - other changes] (RTECS); Inhalation -Human TCLo: 80 ppb [Sense Organs and Special Senses (Olfaction) - effect, not otherwise specified Sense Organs and Special Senses (Eye) - effect, not otherwise specified Lungs, Thorax, or Respiration - other changes] (RTECS); Inhalation -woman TCLo: 300 ppt/8H/5D [Lungs, Thorax, or Respiration - respiratory obstruction] (RTECS); Inhalation -Human TCLo: 20 ppb/2Y [Lungs, Thorax, or Respiration - cough Lungs, Thorax, or Respiration - sputum] (RTECS)
Chronic Ingestion Effects:	Oral - rat TDLo: 15 gm/kg/10D-I Gastrointestinal - other changes Liver - other changes Related to Chronic Data - death (RTECS)
Chronic Inhalation Effects:	Inhalation - rat TCLo: 102 ppb/24H/7D-C Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi; Inhalation -rat TCLo: 26 ppm/6H/5W-I Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi Lungs, Thorax, or Respiration - chronic pulmonary edema Related to Chronic Data - death; Inhalation -rat TCLo: 204 ug/m3/24H/84D-C Behavioral - muscle contraction or spasticity Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - true cholinesterase Biochemical - Metabolism (Intermediary) - lipids including transport (RTECS); Inhalation -mouse TCLo: 990 ppb/6H/14D-I Sense Organs and Special Senses (Olfaction) - effect, not otherwise specified (RTECS); Inhalation -rabbit TCLo: 1500 ppb/6H/79D-I Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi; Inhalation -rabbit TDLo: 1500 ppb/71D-I Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi Related to Chronic Data - death (RTECS); Inhalation -guinea pig TCLo: 3100 ppb/4H/5D-I Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi Blood - changes in leukocyte (WBC) count (RTECS)
Carcinogenicity:	NIOSH Carcinogen. ACGIH TLV-A4 - Not Classifiable as a Human Carcinogen.
Mutagenicity:	Mutation data reported. (RTECS).

Other Toxicological Information:	Intravenous - mouse LD50: 56 mg/kg

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SECTION 12 : ECOLOGICAL INFORMATION

Catalog No. L10867

Ecotoxicity:	LC50 Pimephales promelas 194 mg/L/24H. May be harmful to aquatic organismsbecause of hydrolysis products (DOSE/OHMTADS).
Bioaccumulation:	Not expected to bioaccumulate and/or bioconcentrate in aquatic organisms.
Biodegredation:	Expected to hydrolyse in moist air, soil and water. Vapors are rapidly photodegradable in the atmosphere, estimated half-life 198 minutes (DOSE/HSDB).
Environmental Stability:	Not expected to be persistent in the environment.

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SECTION 13 : DISPOSAL CONSIDERATIONS

Catalog No. L10867

Waste Disposal:	Consult with the US EPA Guidelines listed in 40 CFR Part 261.3 for the classifications of hazardous waste prior to disposal. Furthermore, consult with your state and local waste requirements or guidelines, if applicable, to ensure compliance. Arrange disposal in accordance to the EPA and/or state and local guidelines, by a licensed disposal company.

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SECTION 14 : TRANSPORT INFORMATION

Catalog No. L10867

DOT Shipping Name:	Toluene diisocyanate
DOT Hazard Class:	6.1
DOT Identification Number:	UN2078
DOT Packing Group:	II
DOT Subpart E Labeling Requirement:	6.1

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SECTION 15 : REGULATORY INFORMATION

Catalog No. L10867

4–Methyl–m–phenylene diisocyanate :

TSCA 8(b): Inventory Status:	Listed on the TSCA inventory.
TSCA 8(d): Manufacturer Health and Safety Data	TSCA Section 8(D) - Manufacturer Health and Safety Data : CAS# 584-84-9: Effective Date: June 1, 1987; Sunset Date: June 1, 1997
TSCA 12(b): Export Notification	None of the chemicals are listed under TSCA Section 12b.
Section 302 Extremely Hazardous Substances (RQ):	CAS# 584-84-9: final RQ = 100 pounds (45.4 kg)
Section 112(r): Clean Air Act	CAS# 584-84-9 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
State:	Tolylene-2,4-diisocyanate can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts. California No Significant Risk Level: None of the chemicals in this product are listed.

Risk Phrases:	R26 Very toxic by inhalation. R36/37/38 Irritating to eyes, respiratory system and skin. R40 Possible risks of irreversible effects. R42/43 May cause sensitization by inhalation and skin contact. R52/53 Harmful to aquatic organisms, may cause long term adverse effects in the environment.
Safety Phrase:	S23 Do not breathe vapor S36/37 Wear suitable protective clothing and gloves. S45 In case of accident or if you feel unwell, seek medical advice immediately S61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

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SECTION 16 : ADDITIONAL INFORMATION

Catalog No. L10867

MSDS Preparation Date:	January 1, 2002, Version 1
MSDS Revision Date:	April 14, 2003.
MSDS Author:	Actio Corporation.

Disclaimer:

This Health and Safety Information is correct to the best of our knowledge and belief at the date of its publication but we cannot accept liability for any loss, injury or damage which may result from its use. We shall ensure, so far as is reasonably practicable, that any revision of this Data Sheet is sent to all customers to whom we have directly supplied this substance, but must point out that it is the responsibility of any intermediate supplier to ensure that such revision is passed to the ultimate user. The information given in the Data Sheet is designed only as a guidance for safe handling, storage and the use of the substance. It is not a specification nor does it guarantee any specific properties. All chemicals should be handled only by competent personnel, within a controlled environment.
Should further information be required, this can be obtained through the sales office whose address is at the top of this data sheet. We welcome any additional information about our products that customers have obtained by personal experience.

References:

1. American Chemical Society, STN Easy Online Database
2. Brethericks Reactive Chemical Hazards Database. Version 2.
3. Gassarett and Doulls Toxicology, The Basic Science of Poisons.
4. Hawleys Condensed Chemical Dictionary, Thirteenth Edition
5. IARC monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, WHO International Research on Cancer.
6. Industrial Hygiene and Toxicology, by F.A. Patty.
7. National Library of Medicine, Department of Health and Human Services, Hazardous Substances Data Bank (HSDB).
8. National Toxicology Program (NTP) Eighth Report on Carcinogens, 1997.
9. NIOSH Registry of Toxic Effects of Chemical Substances (RTECS) and Pocket Guide to Chemical Hazards.
10. OSHA Hazard Communication Standard, 1910.1200 and Z Tables.
11. Sax Dangerous Properties of Industrial Materials. Tenth Edition.
12. The Merck Index: An Encyclopedia of Chemicals and Drugs. Merck and Company. Twelfth Edition 1998.
13. Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environmental and Biological Exposure Indices. TLV Booklet, 2001.

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