

25.5+

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

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24-Hour Emergency Phone Number: 989-636-4400

Product: CYCLOTENE\* 4024 - 40 Advanced Electronics Resin

Product Code: 49112

Effective Date: 10/08/04

Date Printed: 10/13/04

MSD: 005293

The Dow Chemical Company, Midland, MI 48674

Customer Information Center: 800-258-2436

2. COMPOSITION/INFORMATION ON INGREDIENTS

B-staged divinylsiloxane-bis-benzocyclobutene	CAS# 124221-30-3	26-44%
Mesitylene	CAS# 000108-67-8	50-73%
Polymerized 1,2-dihydro-2,2,4-trimethylquinoline	CAS# 026780-96-1	0.3-3.1%
2,6-bis{(4-azidophenyl)methylene}-4-ethylcyclohexanone	CAS# 114391-97-8	0.3-2.7%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

\*\*\*\*\*  
\* Yellow liquid. Aromatic solvent odor. \*  
\* May cause eye irritation. Prolonged exposure may cause skin burns. \*  
\* May cause allergic skin reaction. May be harmful if inhaled. May \*  
\* cause respiratory tract irritation. May cause anesthetic effects. \*  
\* Combustible liquid and vapor. \*  
\*\*\*\*\*

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: May cause slight eye irritation. May cause slight corneal injury. Vapor may cause eye irritation experienced as mild discomfort and redness.

SKIN: Brief contact may cause severe skin irritation with pain and local redness. Prolonged or repeated exposure may cause skin burns. May cause more severe response if skin is abraded (scratched or cut). A component in this mixture has caused allergic skin reactions in humans. Prolonged skin contact is

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unlikely to result in absorption of harmful amounts.

INGESTION: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

INHALATION: Vapor concentrations are attainable which could be hazardous on single exposure. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. Repeated excessive exposures may cause central nervous system depression and blood effects. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed. Contains component(s) which, in animals, have been shown to cause liver, lung, kidneys and central nervous system effects.

CANCER INFORMATION: Available data are inadequate to evaluate carcinogenicity.

TERATOLOGY (BIRTH DEFECTS):

Contains component(s) which did not cause birth defects in animals; other fetal effects occurred only at doses toxic to the mother.

REPRODUCTIVE EFFECTS:

In laboratory animal studies on component(s), effects on reproduction were seen only at doses that produced significant toxicity to the parent animals.

4. FIRST AID

EYE: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and

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shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Items which cannot be decontaminated, including leather articles such as shoes, belts, and watchbands should be disposed of properly.

INGESTION: Do not induce vomiting. Call a physician and/or transport to an emergency facility immediately.

INHALATION: Move person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN: If lavage is performed, suggest endotracheal or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. The decision of whether to induce vomiting or not should be made by a physician. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Maintain adequate ventilation and oxygenation of the patient. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

## 5. FIRE FIGHTING MEASURES

## FLAMMABLE PROPERTIES

FLASH POINT: 112F, 44C\*

METHOD USED: SFCC

AUTOIGNITION TEMPERATURE: 1022F

## FLAMMABILITY LIMITS

LFL: 0.88% @ 100C\*

UFL: 6.1% @ 100C\*

\*Based on Mesitylene.

HAZARDOUS COMBUSTION PRODUCTS: Under fire conditions polymers decompose. The smoke may contain polymer fragments of varying compositions in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to: carbon monoxide, carbon dioxide. Hazardous combustion products may include trace amounts of styrene.

OTHER FLAMMABILITY INFORMATION: Dense smoke is produced when

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product burns. Violent steam generation or eruption may occur upon application of direct water stream. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Contact with strong oxidizers may cause fire also.

EXTINGUISHING MEDIA: Water fog or fine spray, carbon dioxide, dry chemical, foam. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function.

MEDIA TO BE AVOIDED: Do not use direct water stream.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Contain fire water run-off if possible. Fire water run-off, if not contained may cause environmental damage. Review the "Protect The Environment" section under "Accidental Release Measures" of this MSDS to determine if material should be allowed to burn out or be extinguished. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Avoid accumulation of water. Product may be carried across water surface spreading fire or contacting an ignition source. Do not use direct water stream. May spread fire. Eliminate ignition sources. Stay upwind. Keep out of low areas where gases (fumes) can accumulate.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Keep unnecessary people away; isolate hazard area and deny unnecessary entry.

PROTECT THE ENVIRONMENT: Vapor explosion hazard, keep out of sewers. Pump with explosion-proof equipment. If available, use foam to smother or suppress. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or

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explosion.

CLEANUP: Use inert absorbent material such as sand or sawdust. Ventilate area and wash spill site after material pick up is complete.

#### 7. HANDLING AND STORAGE

HANDLING: Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. No smoking, open flames or sources of ignition in handling or storage area.

STORAGE: Use of non-sparking or explosion proof equipment may be necessary, depending upon the type of operation. Minimize sources of ignition, such as static buildup, heat, spark or flame.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Use only with adequate ventilation.

##### PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

SKIN PROTECTION: Use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, gloves, boots, apron or full-body suit will depend on operations. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure airline with auxiliary self-contained air supply.

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EXPOSURE GUIDELINE(S): Trimethylbenzene: ACGIH TLV is 25 ppm.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Yellow-amber liquid  
ODOR: Aromatic solvent odor  
VAPOR PRESSURE: 2.49 mm Hg @ 25C  
VAPOR DENSITY (Air=1): 4.1  
BOILING POINT: 324F 162C\*  
SOLUBILITY IN WATER: 0.1%  
SPECIFIC GRAVITY: 0.9521  
\*Based on Mesitylene.

## 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable at ambient temperatures.

CONDITIONS TO AVOID: See Hazardous Polymerization section. Avoid temperatures above 140C. Can react with itself at temperatures above 140C. Flammable vapors can be released at elevated temperatures. Product can oxidize at elevated temperatures. Solvent in product evaporates readily. The 2,6-Bis (4-azido-benzylidene)-4-methylcyclohexanone component is sensitive to light and will start slowly decomposing when heating above 60 degrees C.

INCOMPATIBILITY WITH OTHER MATERIALS: Strong oxidizing agent.

HAZARDOUS DECOMPOSITION PRODUCTS: Refer to Section 5 for Hazardous Combustion Products.

HAZARDOUS POLYMERIZATION: Can occur with heat.

## 11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1)

SKIN: The LD50 for skin absorption in female rabbits is >2000 mg/kg.

INGESTION: The oral LD50 for male rats is >2000 mg/kg.

MUTAGENICITY (EFFECTS ON GENETIC MATERIAL): In vitro genetic toxicity studies were negative for component(s) tested. Genetic toxicity studies in animals were negative for

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component(s) tested.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

#### ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: Based largely or completely on information for mesitylene. Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). Potential for mobility in soil is low (Koc between 500 and 2000). No bioconcentration of the polymeric component is expected because of its high molecular weight.

DEGRADATION & TRANSFORMATION: Based largely or completely on information for mesitylene. Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions. Degradation is expected in the atmospheric environment within minutes to hours.

ECOTOXICOLOGY: Based largely or completely on information for mesitylene. Material is moderately toxic to aquatic organisms on an acute basis (LC50 or EC50 between 1 and 10 mg/L in the most sensitive species tested). Based largely or completely on information for polymeric component. Not expected to be acutely toxic to aquatic organisms.

13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

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As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customers Information Center at 800-258-2436 or 989-832-1556 for further details.

#### 14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): For DOT regulatory information, if required, consult transportation regulations, product shipping papers or contact your Dow representative.

CANADIAN TDG INFORMATION: For TDG regulatory information, if required, consult transportation regulations, product shipping papers, or contact your Dow representative.

#### 15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

#### U.S. REGULATIONS

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SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

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SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

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REGULATORY INFORMATION (CONTINUED)

An immediate health hazard  
A delayed health hazard  
A fire hazard

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TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

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STATE RIGHT-TO-KNOW: This product is not known to contain any substances subject to the disclosure requirements of

Pennsylvania

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OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):

To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

CANADIAN REGULATIONS

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WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

B3 - combustible liquid with a flash point between 37.8C and 93.3C  
D2B - eye or skin irritant  
D2B - skin sensitizer

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## REGULATORY INFORMATION (CONTINUED)

Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer's workplace education program.

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

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HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS:	CAS #	AMOUNT (%w/w)
Mesitylene	000108-67-8	40-70
2,6-bis {(4-azidophenyl) methylene}-4-ethylcyclohexanone	114391-97-8	1-5

## 16. OTHER INFORMATION

PMN: The EPA has identified potential concerns for PMN 95-421 ((2,6-bis{4-azidophenyl} methylene)-4-ethylcyclohexanone), a minor component in this formulation, regarding skin sensitization and eye irritation. EPA recommends that any workers who may be exposed to the substance during manufacturing, processing, and use wear a NIOSH-approved respirator, adequate protective clothing which covers exposed parts of the body, impervious gloves, and chemical safety goggles or equivalent eye protection.

PATENT INFORMATION: This material is covered by pending patent applications and by the following patents:

UNITED STATES:	CANADA:	JAPAN:	EUROPE:
4,540,763	1,242,833	1,556,670	0,191,858
4,642,329	1,260,481	1,565,110	0,372,000
4,661,193	1,264,896	1,664,540	
4,812,588	1,272,338	1,869,961	
5,185,391	1,324,386	1,903,238	
5,288,914			

MSDS STATUS: Revised Sections 3, 4, 8, 11, 12, and 15.

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The Information Herein Is Given In Good Faith, But No Warranty,  
Express Or Implied, Is Made. Consult The Dow Chemical Company  
For Further Information.