INFOTRAC
EMERGENCY #
800.535.5053

MATERIAL SAFETY DATA SHEET

Date Prepared/Revised: April 5, 2006

I. PRODUCT INDENTIFICATION

Trade Name (as labeled): MS-BOND 2P CATALYST
SUPPLIERS NAME:
MURAKAMI SCREEN U.S.A.
745 Monterey Pass Road
Monterey Park, CA 91754
PHONE NUMBER: 800-562-3534

II. COMPOSITION/INFORMATION ON INGREDIENTS

Polymethylene polyphenyl isocyanate CAS# 009016-87-9 100%
containing 4,4' Methylene bisphenylisocyanate CAS# 000101-68-8
(see Regulatory Information Page)

III. HAZARDS IDENTIFICATION EMERGENCY OVERVIEW

Brown liquid. Musty odor. Sprayed or heated material harmful if inhaled. May cause allergic skin reaction. May cause allergic respiratory reaction and lung injury. Avoid temperatures above 105F (41C). Toxic flammable gases and heat are released under decomposition conditions. Toxic fumes may be released in fire situations. Reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction. Isolate area. Keep upwind of spill.

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)
EYE: May cause moderate eye irritation. May cause slight temporary corneal injury.
SKIN: Prolonged or repeated exposure may cause slight skin irritation. Skin contact may cause an allergic skin reaction. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. Prolonged skin contact is unlikely to result in absorption of harmful amounts. May stain skin.

INGESTION: Low toxicity if swallowed. Harmful effects not anticipated from swallowing small amount.
INHALATION: At room temperature, vapors are minimal due to low volatility. However, certain operations may generate vapor or mist concentrations sufficient to cause respiratory irritation and other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or pumping. Excessive exposure may cause irritation to upper respiratory tract and lungs, and pulmonary edema (fluid in the lungs). May cause allergic respiratory response. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Effects may be delayed. Occacasionally, breathing difficulty may be life threatening. Decreased lung function has been associated with overexposure to isocyanates.
SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/Polymeric MDI aerosols.
CANCER INFORMATION: lung tumors have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury.Current exposure guidelines are expected to protect

against these effects reported for MDI.
TERATOLOGY (BIRTH DEFECTS): In laboratory animals, MDI/Polymeric MDI did not cause birth defects; other fetal
effects occurred only at high doses which were toxic to the mother. REPRODUCTIVE EFFECTS: No relevant information
found

IV. FIRST AID

EYE: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably an ophthalmologist.
SKIN: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. An MDI skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water. Items, which cannot be decontaminated, including leather articles such as shoes, belts and watchbands, should be disposed of properly.
INGESTION: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel. INHALATION: Move person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel should administer oxygen. Call a physician or transport to a medical facility. NOTE TO PHYSICIAN: May cause respiratory sensitization or asthma like symptoms. Bronchodilators, expectorants, and antitussives may be of help. Excessive exposure may aggravate pre-existing asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome). Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Respiratory symptoms, including pulmenary edema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress. Maintain adequate ventilation and oxygenation of the patient. If you are sensitized to diisocyanates, consult your physician regarding working with other respiratory irritants or sensitizers. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinicall condition of the patient.

V. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES
FLASH POINT: >400F, >204C
METHOD USED: PMCC, ASTM D93
AUTOIGNITION TEMPERATURE: >1100F, 600C
FLAMMABILITY LIMITS
LFL: Not applicable.
UFL: Not applicable.
HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include but are not limited to: nitrogen oxides, isocyanates, hydrogen cyanide, carbon monoxide, and carbon dioxide.
OTHER FLAMMABILITY INFORMATION; Product reacts with water. Reaction may produce heat and/or gases. Reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns.
EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, foam, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General-purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Do not use direct water stream. May spread fire.
FIRE FIGHTING INSTRUCTIONS; Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water is not

recommended but may be applied in very large quantities as a fine spray when other extinguishing agents are not available. Contain fire water run-off if possible. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out. Immediately withdraw all personnel from area in case of rising sound from venting safety device or discoloration of the container. Move container from fire area if this is possible without hazard.

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). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. This will not provide sufficient fire protection; consider fighting fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

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

PROTECT PEOPLE: Isolate area. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. Keep unnecessary and unprotected personnel from entering the area. If available, use foam to suppress vapors. Refer to Section 7, Handling for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls/Personal Protection.

PROTECT THE ENVIRONMENT: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 3.2, Ecological Information.

CLEANUP: Contain spilled material if possible. Absorb with material such as: sawdust, vermiculite dirt, sand, clay, cob grit, Milsorb(R). Do not use absorbent materials such as cement powder (note: may generate heat). Collect in suitable and properly labeled open containers. Do not place in sealed containers. Suitable containers include metal drums, plastic drums, polylined fiber packs. Wash the spill site with large quantities of water. Attempt to neutralize by adding suitable decontaminant solution: Formulation 1: sodium carbonate 5—10%; liquid detergent 0.2—2%; water to make up to 100% or Formulation 2; concentrated ammonia solution 3—8%; liquid detergent 0.2-2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. Contact CCI for clean-up assistance. See Section 13, Disposal Considerations for additional information.

VII. HANDLING AND STORAGE

HANDLING: Avoid breathing vapor. Avoid contact with eyes, skin or clothing. Use with adequate ventilation. Wash thoroughly after handling. Keep container tightly closed. See Section 8, Exposure Controls/Personal Protection. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

STORAGE: Store in a dry place. Storage temperature is 75—104F (24-41C). Protect from atmospheric moisture. Maintain a nitrogen atmosphere. Do not store product contaminated with water to prevent potentially hazardous reaction. See Section 10 for more specific information. Additional storage and handling information on this product can be obtained by calling your CCI sales or customer service contact.

VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and the people working at this point. The odor and irritation of this material are inadequate to warn of excessive exposure. Local exhaust ventilation may be necessary for some operations.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use chemical goggles.

SKIN PROTECTION Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, gloves, boots, apron, or full-body suit will depend on operation. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items, which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.
RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (airline or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.
EXPOSURE GUIDELINES (S): Methylene bisphenyl isocyanate (MDI): ACGIH TLV is 0.005 ppm TWA and OSHA PEL is 0.02 ppm Ceiling, R-SEN. An R-SEN notation following the exposure guideline refers to the potential to produce respiratory sensitization, as confirmed by human or animal data.

IX. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE: Brown liquid
ODOR: Musty
VAPOR PRESSURE; <1 x 10(-5) mmHg @ 25C
VAPOR DENSITY: 8.5 (air=1)
BOILING POINT: 410F, 210C @ 5 mmHg
SOLUBILITY IN WATER: Insoluble in water, reacts with evolution of CO2.
SPECIFIC GRAVITY: 1.24 @ 2O C
PH: Not applicable.

X. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable under recommended storage conditions. See Section 7, Storage.
CONDITIONS TO AVOID: Avoid temperatures above 105F, 41C. Avoid temperatures below 75F, 24C. Can react with itself at temperatures above 320F, 160C. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid. Avoid moisture. Material reacts slowly with water, releasing carbon dioxide, which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction. INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with acids, water, alcohols, amines, ammonia, bases, moist air, and strong oxidizers. Avoid contact with metals such as aluminum, brass, copper, galvanized metals, tin, zinc. Avoid contact with moist organic absorbents. Reaction with water will generate carbon dioxide and heat. Generation of gas can cause pressure buildup in closed systems. Avoid unintended contact with polyols. The reaction of polyols and isocyanates generates heat. Diisocyanates react with many materials and the rate of reaction increases with temperature as well as increased contact; these reactions can become violent. Contact is increased by stirring or if the other material mixes with the diisocyanate. Diisocyanates are not soluble in water and are denser than water and sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea. See Hazardous Polymerization Section.

HAZARDOUS DECOMPOSITION PRODUCTS: Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

HAZARDOUS POLYMERIZATION: Can occur. Polymerization can be catalyzed by: strong bases and water. Can react with itself at temperatures above 320F (16OC).

XI. 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 LD5O for skin absorption in rabbits is >2000 mg/kg.
INGESTION: The oral L050 for rats is >10, 000 mg/kg.
MUTAGENICITY (EFFECTS ON GENETIC MATERIAL): Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in-vitro studies; other in-vitro studies were negative. Animal genetic toxicity studies were predominantly negative.

XII. 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 MDI and polymeric MDI: in the aquatic or terrestrial environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas.
DEGRADATION & PERSISTENCE: Based largely or completely on information for MDI and polymeric MDI: in the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
ECOTOXICITY: Based largely or completely on information for MDI and polymeric MDI: the measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC5O or EC5O >100 mg/L in the most sensitive species tested). The LC5O in earthworm Eisenia foetida is >1000 mg/ kg.

XIII. 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. MURAKAMI 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. For additional information, refer to:

-Handling & Storage Information, MSDS Section 7.

-Stability & Reactivity Information, MSDS Section 10.

-Regulatory Information, MSDS Section 15.

XIV. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.) For D.O.T. regulatory information, if required, consult transport regulations, product shipping papers, or contact your CCI representative.
CANADIAN TDG INFORMATION: For TDG regulatory information, if required, consult transport regulations, product shipping papers, or contact your CCI representative.

XV. 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, (Continued on page 10) , over) 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

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME CAS NUMBER CONCENTRATION

METHYLENE BIS(PHENYLISOCYANATE)(MDI)000101-68-8 42-45 %

POLYMERIC DIPHENYLMETHANE DIISOCYANATE 009016-87-9 100 %

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:
An immediate health hazard
A delayed health hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):
All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

The CAS number(s) for TSCA is(are);
CAS# 009016-87-9
CAS# 000101-68-8
REGULATORY INFORMATION (CONTINUED) certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME CAS NUMBER LIST

METHYLENE B1S (PHENYLISOCYANATE) (MDI) 000101-68-8 PA1 PA3
PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).
PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

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

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):
This product Contains the following substance(s) listed as “Hazardous Substances” under CERCLA which may require reporting of releases:
Category:
Chemical Name CAS# RQ % in Product

Methylene bisphenyl isocyanate 000101-68-8 5000 42-45