

INSTABILITY:

The product is normally stable.

INCOMPATIBILITY:

Avoid contact with:

Free radical initiators; Strong acids; Strong bases; Reducing agents; Oxidizing agents; Acids; Bases; Free radical inhibitors; Chloroform in the presence of a strong base; Magnesium; Sulfuric acid; Bromine; Nitric acid; Alcohols; Light; Heat; Metals; Strong oxidizers; Strong oxidizing agents; Perchloric acid; Inert gases; Chromic anhydride; Oxidizers; Halogenated Hydrocarbons.

DECOMPOSITION:

Decomposition products:

Carbon Dioxide (CO₂); Carbon Monoxide (CO); Formaldehyde; Silicon oxides; Nitrogen oxides; Water.

POLYMERIZATION:

The product does not normally polymerize significantly.

***** FIRE & EXPLOSION DATA *****

FLASHPOINT: 158 Closed cup

FIRE & EXPLOSION HAZARDS:

KEEP AWAY FROM SPARKS AND OPEN FLAMES. Do not smoke in area with open product;

If the product may be heated above its flashpoint during processing, remove sources of ignition such as open sparks, flames or static discharge to prevent vapor ignition.

EXTINGUISHING MEDIA:

Sand, dry chemical, or carbon dioxide.

SPECIAL FIREFIGHTING INFORMATION:

Toxic decomposition products may form under fire conditions. (See Decomposition Section.);

Wear full protective clothing and a full facepiece, positive pressure, self-contained breathing apparatus (SCBA);

Decontaminate contaminated clothing and equipment with soap and water. Dispose of residues per federal, state, and local regulation. (See Waste Disposal Section.).

***** HEALTH HAZARD INFORMATION *****

OVERVIEW: The most likely routes of overexposure to this product are skin contact and inhalation. Skin irritation and/or other effects of skin contact are easily avoided by using proper gloves (see section titled GLOVES) and washing affected areas immediately if contact occurs. Volatile solvents will start evaporating during room temperature use of the product, such as thinning, pouring from jar to dispensing machine, and spin coating. Mist and solvent vapors will evolve if spray application is used. During wafer drying, 125 - 150 C, and final curing, 350 - 450 C, the remaining solvent(s) will evaporate. Potential overexposure to other chemicals used in the operation such as wafer etchants and cleaners should also be considered. Well designed area and personal air sampling and analysis can show if exposures are within established limits. Properly designed local ventilation and process enclosure are effective ways to limit employee exposure where needed.

In addition to meeting exposure limits, it is always prudent to use all practical means to minimize employee exposure to chemicals. A significant difference in overall exposure can be made with practical measures such as:

- * Inhalation - minimizing by keeping jars of product covered
- * Eye - avoiding contact by wearing chemical splash goggles where there is splash potential
- * Ingestion - avoiding by washing hands before eating, drinking or smoking, and restricting these activities to outside the work area.

PRINCIPAL HEALTH EFFECTS:

>>>Methanol

****Additional animal tests have shown: Has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals; Animal tests demonstrate developmental toxicity; No genetic damage in animals, bacterial or mammalian cell cultures; No animal data available to define reproductive toxicity; No animal data available to define carcinogenicity. ****Human health effects of overexposure may include: BY SKIN CONTACT: Skin permeation may occur in amounts capable of producing effects of systemic toxicity; Skin irritation with itching, burning, redness, swelling or rash; BY EYE CONTACT: Eye irritation with discomfort, tearing, or blurring of vision; BY INHALATION: Irritation of mouth causing coughing, wheezing, headaches, nausea and vomiting; Sore throat; Irritation of the nose and throat; Sneezing; Runny nose; BY INGESTION: May cause digestive tract irritation with stomach pain, heartburn, nausea, vomiting or diarrhea; BY CONTACT, INHALATION, OR INGESTION: Central nervous system depression with dizziness, confusion, incoordination, drowsiness, or unconsciousness; Nonspecific discomfort, e.g., nausea, headache or weakness.

****Human effects of higher level acute, repeated or chronic overexposure may include: BY CONTACT, INHALATION, OR INGESTION: Kidney damage; Heartburn; Liver damage; Nerve damage with numbness, weakness or muscle rigidity; Fatality can result from gross overexposure. ***In addition: If metabolic acidosis occurs, visual disturbance, including blindness, may follow; Animal tests have shown teratogenic effects so, this substance may be a teratogen in humans. A teratogen is a substance that may cause physical defects in the developing embryo or fetus when a pregnant female is exposed to that substance. Odor threshold for this substance is 100 parts per million.

>>>DIMETHYL ACETAMIDE

Toxic effects of repeated or prolonged animal exposures include: BY SKIN CONTACT: Skin effects; Central nervous system effects; Degenerative changes in liver; Incoordination; BY INHALATION: Retinal degeneration in female mice; Respiratory tract irritation; Bone marrow effects; BY INGESTION: Weight loss; Diarrhea; Adrenal effects; Anemia; BY INHALATION OR INGESTION: Testicular effects; ****Additional animal tests have shown: Has not caused permanent genetic damage in reproductive cells of mammals; No genetic damage in animals; No carcinogenic activity based on tests; No reproductive toxicity based on testing; No heritable genetic damage; No genetic damage in bacterial cell cultures; Developmental effects only at levels producing other toxic effects in adult animal. ****Human health effects of overexposure may include: BY SKIN CONTACT: Irritation; There are no reports of human sensitization; BY EYE CONTACT: May cause irritation with discomfort, tearing or blurred vision; BY CONTACT, INHALATION, OR INGESTION: Drowsiness; Dizziness; Nonspecific discomfort, e.g., nausea, headache or weakness. ****Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN CONTACT: Irritation with itching, redness, or swelling; Skin permeation may occur in amounts capable of producing the effects of systemic toxicity; BY INHALATION: Hallucinations; Depression; Lethargy; Abnormal liver function with jaundice; Brain effects; BY CONTACT, INHALATION, OR INGESTION: May cause altered kidney function with altered results on blood test; May cause altered liver function or abdominal pain. ***In addition: BY SKIN CONTACT: If there is significant potential for skin contact with Dimethyl amide (DMAC), biological monitoring should be done to measure the level of DMAC metabolites in urine specimens collected at the end of the shift. It is a DuPont practice to limit an individual's end of shift DMAC metabolites to levels at or below 40 ppm expressed as N-methylacetamide (MMAC).

>>>N-Cyclohexyl -2-Pyrrolidone

****Toxic effects described in animals include: BY SKIN OR EYE CONTACT: Moderate to severe skin irritation; Corrosive to the eye.

>>>Acrylate Ester

****Human health effects of overexposure may include: BY SKIN CONTACT: Moderate irritation; May cause skin sensitization; Blistering; BY EYE CONTACT: Slight irritation; BY INHALATION: Coughing; Shortness of breath; Mucous production; At elevated temperatures, vapors may irritate respiratory tract; BY INGESTION: No known or anticipated toxic effects. ****Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN CONTACT: Skin permeation may occur in amounts capable of producing the effects of systemic toxicity.

>>>Photosensitive Polyimide Resin

****Human health effects of overexposure may include: BY SKIN CONTACT: May cause irritation; BY INHALATION: May cause irritation. ****Human effects of higher level acute, repeated or chronic overexposure may include: BY CONTACT, INHALATION, OR INGESTION: No acceptable information available to confidently predict the effects of excessive human exposure to this compound.

>>>Proprietary Ingredient(s)

****Toxic effects described in animals include: BY SKIN OR EYE CONTACT: Mild skin irritation; Mild eye irritation; No skin sensitization; BY INHALATION: Upper respiratory irritation. ****Additional animal tests have shown: No mutagenic toxicity.

>>>Proprietary Ingredient(s)

****Toxic effects described in animals include: Skin irritation; Eye irritation.

>>>Proprietary Ingredient(s)

****Human health effects of overexposure may include: BY CONTACT, INHALATION, OR INGESTION: No known or anticipated toxic effects.

Individuals may have increased susceptibility to the hazards of overexposure to ingredient(s) of this product if they have pre-existing diseases of the:

Skin; Central nervous system; Eyes; Cardiovascular system; Liver; Kidneys.

ANIMAL DATA:

>>>Methanol

Inhalation 1 hour LC50 [Rats]: > 145,000 ppm
Oral LD50 [Rats]: 9,100 mg/kg
Skin LD50 [Rabbits]: 15,840 mg/kg.

>>>DIMETHYL ACETAMIDE

Inhalation 1 hour LC50 [female rat]: 8.81 mg/l
Oral LD50 [female rat]: 4930 mg/kg
Skin LD50 [rabbit]: 2240 mg/kg.

Inhalation 1 hour LC50: 120 ppm in rats
 Skin absorption LD50: 1600 mg/kg in rabbits.

>>>Acrylate Ester
 No information available.

>>>Photosensitive Polyimide Resin
 No information found.

>>>Proprietary Ingredient(s)
 Oral ALD [Rats]: >5,000 mg/kg.

>>>Proprietary Ingredient(s)
 No information found.

>>>Proprietary Ingredient(s)
 ORAL LD50 [mouse]: >1000 mg/kg
 DERMAL LD50 [rat]: > 500 mg/kg.

CARCINOGENICITY LISTING:

No ingredients of this product are designated by IARC, NTP, OSHA, ACGIH or Dupont as potential carcinogens.

EXPOSURE LIMITS:

Workplace exposures should be kept below the following limits:

Name/Units	AIHA		ACGIH		OSHA	
	8hr	15min	8hr	15min	8hr	15min
METHANOL						
Units: ppm			200	250 (S)	200	250 (S)
DI METHYLACETAMIDE						
Units: ppm			10		10	

Also, DuPont has established and observes the following limits:

Name/Units	12 hr	8hr	15min	Ceiling
METHANOL				
Units: ppm	200	200		(S)
DI METHYLACETAMIDE				
Units: ppm	10	10		

NOTES ON EXPOSURE LIMITS:

PELs - OSHA Permissible Exposure Limits - 29 CFR 1910.1000, Subpart Z, or specific substance standards;
 TLVs - ACGIH Threshold Limit Values - published by American Conference of Governmental Industrial Hygienists, 6500 Glenway Avenue, Cincinnati, OH 45211;
 WEELs- AIHA Workplace Environmental Exposure Limits - published by the American Industrial Hygiene Association, 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031;

AELs - Dupont Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits are lower than AEL in effect, government limits shall take precedence;
(C) = "ceiling", limit not to be exceeded for any time period;
(S) = "skin" , skin absorption may contribute significantly to the ingredient's internal toxicity.

***** FIRST AID INSTRUCTIONS *****

- Skin Contact: For skin contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reuse.
- Eye Contact: For eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician; In case of eye contact, immediately rinse with clean water for 20-30 minutes. Retract eyelids often. Obtain emergency medical attention.
- Inhalation: If inhaled, remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
- Ingestion: If swallowed, do not induce vomiting. Immediately give two glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

***** PROTECTION INFORMATION *****

Adequate local ventilation should be used to keep exposures below applicable limits;
Other engineering controls such as totally enclosed handling systems are also preferred;
Respiratory protection will be needed if exposures can not be kept below applicable limits by other means.

Respiratory Protection:

If respirators are needed to meet applicable limits, a respiratory protection program up to the level of OSHA Standard 29 CFR 1910.134 is mandatory. This includes air monitoring, selection, medical approval, training, fit testing, inspection, maintenance, cleaning, storage, etc.. Selection of a suitable respirator will depend on the properties of the contaminant(s) and their actual or expected air concentration(s) versus applicable limits. Consult ANSI Standard Z88.2 for decision logic to select appropriate NIOSH/MESA approved respirators;

Gloves:

Gloves should be used when the possibility of skin contact exists;
The suitability of a particular glove and glove material should be determined as part of an overall glove program. Considerations may include chemical breakthrough time; permeation rate; abrasion, cut and puncture resistance; flexibility; duration of contact; etc.

Recommended glove materials:

Neoprene®, based on DuPont experience. Because the product is a complex mixture, glove testing may be appropriate as part of the glove selection process.

Other Protection Practices:

Appropriate eye protection such as chemical splash goggles should be used if the possibility of eye contact exists;
Protective outer clothing should be used where the possibility of body contact exists. Contaminated work clothing should not be allowed out of the workplace;
Do not smoke, consume or store food or drinks in areas where the product is handled or stored. After handling the product, wash hands thoroughly before leaving the work area;
Additional engineering controls, work practices and training may be required depending on exposure levels. These are discussed in the OSHA Respiratory Protection Standard (29 CFR 1910.134) and OSHA Hazard Communication Standard (29 CFR 1910.1200);
Do not breath dust. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling.

***** DISPOSAL INFORMATION *****

Spill, Leak or Release:

FOR SMALL SPILLS, absorb on rags, sand or other absorbent material;
FOR LARGE SPILLS, get workers out of affected area. If flammable liquids or vapors may be present, turn off electrical devices or other sources of sparks or flames. WEAR PROTECTIVE EQUIPMENT. Use supplied-air respiratory protection if vapor concentrations are not known;
Contain spill at source by diking or absorbing with sand. Do not allow spill to spread to or intentionally flush to sewer or ground. Wash area thoroughly. Adequately ventilate area;
Spill residue, cleaning rags and absorbent may be considered hazardous. (See Waste Disposal Section.).

Waste Disposal:

Components of this product may be considered hazardous;
Consult applicable Federal, State, and local regulations for allowable disposal methods.

***** PRODUCT INFORMATION *****

Contains photoreactive chemicals. Open and use under yellow light.

Contaminated Items:

Empty product containers, contaminated clothing and cleaning materials, etc. should be considered hazardous until decontaminated or properly disposed of. (See Waste Disposal Section.).

Storage:

Store product in a cool location, away from sunlight or ultraviolet light to ensure product viscosity stability.

***** ADDITIONAL INFORMATION *****

The following ingredients are subject to the reporting requirements of section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

INGREDIENT(S)	Weight %
Methanol, 67-56-1	1 - 5%

This product is a physical mixture. The health effects information about this product is based on the individual ingredients; The data in this Material Safety Data Sheet relates only to the specific product designated herein and does not relate to its use in combination with any other material or in any process.

Date of latest MSDS revision: 04/27/00

Person Responsible for MSDS: Environmental Technologist
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Shipping Report (Flammable Components)

Substance	Flashpoint	Shipcode(DOT)	Shipcode(ICA0)
-----Subcomponent-----	-----	-----	Flashpoint--Percent
HD4012XB METHANOL			(<100F) 1.32