# Material Safety Data Sheet

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## PI-2574

PI2574 Revised 1-OCT-2006 Printed 1-OCT-2009

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CHEMICAL PRODUCT/COMPANY IDENTIFICATION

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Tradenames and Synonyms

Pyralin(R) polyimide precursor coatings, Polyamic acid

Company Identification

MANUFACTURER/DISTRIBUTOR

HD MicroSystems
Cheesequake Road
Parlin
New Jersey
USA
08859

PHONE NUMBERS

| | | |
|---|---|---|
| Product Information | : | (800) 346-5656 |
| Transport Emergency | : | (800) 424-9300 (Outside the US (703) 527-3887) |
| Medical Emergency | : | (800) 441-7515 (Outside the US (302) 774-1000) |

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COMPOSITION/INFORMATION ON INGREDIENTS

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# Components

| Material | CAS Number | % |
|---|---|---|
| Polyamic acid of Benzophenone Tetracarboxylic Dianhydride/4,4-Oxydianiline/m-Phenylenediamine Polymer | 31942-21-9 | 10-30 |
| *n-Methylpyrrolidone | 872-50-4 | >60 |

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

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HAZARDS IDENTIFICATION

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# Potential Health Effects

OVERVIEW

The most likely routes 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

(HAZARDS IDENTIFICATION - Continued)

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.

>>>Polyamic acid of Benzophenone Tetracarboxylic Dianhydride/4,4-Oxydianiline/m-Phenylenediamine (Polymer)
****Toxic effects described in animals include: BY SKIN OR EYE CONTACT: Skin irritation; Skin sensitization; Eye irritation.

>>>N-Methylpyrollidone
****Toxic effects described in animals include: BY SKIN OR EYE CONTACT: Mild skin irritation; No skin sensitization; BY INHALATION: Respiratory effects. Toxic effects of repeated or prolonged animal exposures include: BY INHALATION: Respiratory effects; Bone marrow effects; Lymph system effects; Testicular effects; ****Additional animal tests have shown: No carcinogenic activity; No developmental toxicity; No genetic damage in bacterial or mammalian cell cultures; No reproductive toxicity. ****Human health effects of overexposure may include: By contact with liquid or vapor: Eye irritation with discomfort, tearing, or blurring of vision; BY SKIN OR EYE CONTACT: Eye irritation with discomfort, tearing, or blurring of vision; Skin irritation with itching, burning, redness, swelling or rash; BY INHALATION: Runny nose; Sore throat; Sneezing; Irritation of the nose and throat; Nonspecific discomfort, e.g., nausea, headache or weakness. ****Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN OR EYE CONTACT: Skin reddening; Skin irritation with discomfort or rash; Dermatitis; Swelling; Burning. ***In addition: BY SKIN OR EYE CONTACT: There are inconclusive or unverified reports of human sensitization.

Individuals may have increased susceptibility to the hazards

(HAZARDS IDENTIFICATION - Continued)

of overexposure to ingredient(s) of this product if they have pre-existing diseases of the: Eyes; Cardiovascular system; Liver; Kidneys.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

## FIRST AID MEASURES

First Aid

INHALATION

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

In case of 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

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

If swallowed, do not induce vomiting. Immediately give 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

Notes to Physicians

Activated charcoal mixture may be beneficial. Suspend 50 g activated charcoal in 400 mL water and mix well. Administer 5 mL/kg, or 350 mL for an average adult.

## FIRE FIGHTING MEASURES

Flammable Properties

| | |
|---|---|
| Flash Point | : 155 F (68 C) |
| Method | : Setaflash Closed Cup - SCC. |

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(FIRE FIGHTING MEASURES - Continued)

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

Water Spray, Dry Chemical, Carbon Dioxide.

Fire Fighting Instructions

Wear full protective equipment. Thoroughly decontaminate all equipment used in firefighting efforts before returning to service.

Toxic decomposition products may form under fire conditions. (See Decomposition Section.); Wear a full facepiece, positive pressure, self-contained breathing apparatus (SCBA); Dispose of residues per federal, state, and local regulation. (See Waste Disposal Section.).

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## ACCIDENTAL RELEASE MEASURES

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Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Evacuate personnel, thoroughly ventilate area, use self-contained breathing apparatus.

Spill Clean Up

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.).

## HANDLING AND STORAGE

### Handling (Personnel)

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 refrigerated location (0-4F), away from sunlight or ultraviolet light to ensure product viscosity stability.

## EXPOSURE CONTROLS/PERSONAL PROTECTION

# Engineering Controls

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

### Personal Protective Equipment

Respiratory Protection:
Selection of a suitable respirator will depend on the properties of the contaminant(s) and their actual or expecte air concentration(s) versus applicable limits. Consult ANSI Standard Z88.2 for decision logic to select appropriate NIOSH/MESA approved respirators; If respirators are needed to meet applicable limits, a respiratory protection group 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.

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.

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

(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

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.

Exposure Guidelines

Applicable Exposure Limits
n-Methylpyrrolidone

| | | |
|---|---|---|
| PEL | (OSHA) | : None Established |
| TLV | (ACGIH) | : None Established |
| AEL * | (DuPont) | : 5 ppm, 8 & 12 Hr. TWA, Skin |
| WEEL | (AIHA) | : 10 ppm, 8 Hr. TWA, Skin |

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

## PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

| | |
|---|---|
| Form | : Viscous Liquid. |
| Color | : Brown. |
| Solubility in Water | : Slight |
| Odor | : Aromatic. |

## STABILITY AND REACTIVITY

# Chemical Stability

Stable at normal temperatures and recommended storage conditions.

# Incompatibility with Other Materials

Reducing agents; Oxidizing agents; Bases; Acids; Strong Acids; Strong Oxidizers.

# Decomposition

Carbon monoxide (CO); Nitrogen oxides; Carbon dioxide; water; Various hydrocarbons

(STABILITY AND REACTIVITY - Continued)

# Polymerization

Polymerization will not occur.

The product may polymerize endothermically if exposed to temperatures over 90 F, ultraviolet light or free radical initiators. This may increase viscosity.

## TOXICOLOGICAL INFORMATION

# Animal Data

No information found.

>>>N-Methyl-2-Pyrollidone
Inhalation 4 hour ALC: 1.7 mg/L in rats (Moderately toxic)
Skin absorption LD50: > 8,000 mg/kg in rabbits (Slightly toxic)
Oral LD50: 4,320 mg/kg (Slightly toxic).

## DISPOSAL CONSIDERATIONS

Waste Disposal

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

Container Disposal

Empty product containers should be considered hazardous until decontaminated or properly disposed of. (See Waste Disposal Section.).

## REGULATORY INFORMATION

# U.S. Federal Regulations

All Ingredients in This Product Are TSCA Listed/Reported.

# State Regulations (U.S.)

WARNING - SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM-
n-Methylpyrrolidone

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OTHER INFORMATION

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The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : HD MicroSystems(TM)
Address : Cheesequake Road
Parlin, NJ 08859
Telephone : 1-800-346-5656

# Indicates updated section.

End of MSDS