

Material Safety Data Sheet



PA-400D

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Revised 19-NOV-2008

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CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Tradenames and Synonyms

Polyimide Developer

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)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
4-Butyrolactone	96-48-0	>60
Butyl Acetate	123-86-4	30-60

HAZARDS IDENTIFICATION

Potential Health Effects

This product is a physical mixture. The health effects information about this product is based on the individual ingredients;

OVERVIEW: The most likely routes to exposure 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 container to dispensing machine, and roll coating. Mist and solvent vapors will evolve if spray application is used. During drying, 25 C - 120 C, bake out at 350 C - 400 C, and firing

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(HAZARDS IDENTIFICATION - Continued)

of tape substrate at 850 C, the remaining organics will evaporate and/or decompose. Potential overexposure to other chemicals used in the operation 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 containers covered when not in use.
- * 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:

>>>4-Butyrolactone

****Toxic effects described in animals include: BY SKIN OR EYE CONTACT: Moderate skin irritation; Moderate eye irritation; No skin sensitization; BY INHALATION: Respiration rate changes; Hyperactivity; Lethargy/inactivity. Toxic effects of repeated or prolonged animal exposures include: BY INHALATION: Respiration rate changes; BY INGESTION: Nasal effects; Lethargy/inactivity; Weight loss; ****Additional animal tests have shown: No carcinogenic activity; No mutagenic toxicity; No developmental toxicity. ****Human health effects of overexposure may include: BY SKIN OR EYE CONTACT: Skin irritation with discomfort or rash; Eye irritation with discomfort, tearing, or blurring of vision. ****Human effects of higher level acute, repeated or chronic overexposure may include: Irritation of the upper respiratory passages with coughing and discomfort; Temporary central nervous system depression with anaesthetic effects: dizziness, headache, confusion, incoordination, and loss of consciousness; BY INHALATION: Irritation of the upper respiratory passages with coughing and discomfort. ***In addition: Skin permeation can occur in amounts capable of producing effects of systemic toxicity.

Individuals may have increased susceptibility to the hazards of overexposure to ingredient(s) of this product if they have pre-existing diseases of the:
Central nervous system; Lungs.

>>>Butyl Acetate

Skin contact may initially include: skin irritation with

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(HAZARDS IDENTIFICATION - Continued)

discomfort or rash; or allergic skin rashes. The compound has been infrequently associated with skin sensitization in humans. Significant skin permeation, and systemic toxicity, after contact appears unlikely. Eye contact may cause eye irritation with discomfort, tearing, or blurring of vision.

Inhalation may initially include: nonspecific discomfort, such as nausea, headache, or weakness; or irritation of the upper respiratory passages, with coughing.

Based on data from tests with animals higher exposures may lead to these effects: abnormal liver function as detected by laboratory tests; or temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. Individuals with pre-existing diseases of the central nervous system may have increased susceptibility to the toxicity of excessive exposures.

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.

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(FIRST AID MEASURES - Continued)

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 : 83 F (28 C)
Method : Open Cup.

FIRE & EXPLOSION HAZARDS:

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

The solvent vapors are heavier than air and may travel along the floor to a source of ignition and flashback; Use the product in areas and equipment with appropriate National Electric Code (NEC) classification. Consider the need for spark proof tools;

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.).

ACCIDENTAL RELEASE MEASURES

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.

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(ACCIDENTAL RELEASE MEASURES - Continued)

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 cool location, away from sunlight or ultraviolet light to ensure product viscosity stability. Do not store the product in areas where vapors may contact sources of heat, sparks or open flame.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation.

Personal Protective Equipment

Respiratory Protection:

A NIOSH/MSHA approved full-face mask equipped with chemical cartridges approved for methylamine may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, when exposure levels are not known, or in any other circumstances where air purifying respirators may not provide adequate protection; For most

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(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator. In dusty atmospheres, use an approved dust respirator;

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; A NIOSH/MSHA/OSHA approved air purifying respiratory with a dust/mist cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed limits. Protection provided by air purifying respirators is limited. 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; Use a positive pressure air-supplied respirator if concentrations may exceed exposure limits. Air-purifying respirators are inadequate for this material; 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; An OSHA/NIOSH respirator for protection against Nuisance Dust is recommended.

Respirators with organic vapor cartridges provide adequate protection, within use limitations, for the following components in this product: Cyclohexanone

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 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

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(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

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

Butyl Acetate

PEL (OSHA) : 150 ppm, 710 mg/m³, 8 Hr. TWA

TLV (ACGIH) : 150 ppm, 8 Hr. TWA

AEL * (DuPont) : None Established

* 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 : Liquid.

Color : Colorless.

Solubility in Water : High to Miscible

Odor : Acrylate.

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and recommended storage conditions.

Conditions to Avoid

Reducing agents; Oxidizing agents; Bases; Acids; Strong Acids; Strong Oxidizers; Inert gases; Direct Sunlight.

Incompatibility with Other Materials

Reducing agents; Oxidizing agents; Bases; Acids; Strong Acids; Strong Oxidizers; Inert gases; Direct Sunlight.

Decomposition

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

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(STABILITY AND REACTIVITY - Continued)

Polymerization

Does not normally polymerize significantly.

TOXICOLOGICAL INFORMATION

Animal Data

>>>4-Butyrolactone

Inhalation 4 hour LC50: >5.1 mg/L in rats

Skin absorption LD50: >10 mL/kg in guinea pigs

Oral LD50: 800-1600 mg/kg in rats.

>>>Butyl Acetate

Inhalation 4 hour LC50: 9200 ppm in rats

Skin absorption ALD: > 17,652 mg/kg in rabbits

Oral LD50: 14,130 mg/kg in rats

ECOLOGICAL INFORMATION

Ecotoxicological Information

No information is available.

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.).

TRANSPORTATION INFORMATION

Shipping Information

ICAO

UN No. : UN 1263

Proper Shipping Name : Paint Related Material

Hazard Class : 3

Packing Group : III

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REGULATORY INFORMATION

U.S. Federal Regulations

All Ingredients in This Product Are TSCA Listed/Reported.

No ingredients of this product 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.

Density = 1.039 g/ml

State Regulations (U.S.)

SUBSTANCE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: NONE

OTHER INFORMATION

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 : Chesapeake Road
Parlin, NJ
Telephone : 800-346-5656

Indicates updated section.

End of MSDS