HD MicroSystems™
An Enterprise of Hitachi Chemical and DuPont Electronics

Material Safety Data Sheet

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Tradenames and Synonyms

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	%
*N-Methyl-2-Pyrollidone	872-50-4	30-60
1-Methoxy-2-Propanol	107-98-2	30-60

* 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.

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 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:

>>>1-Methoxy-2-Propanol
****Toxic effects described in animals include: BY SKIN OR EYE CONTACT: Slight skin irritation; Eye irritation; Central nervous system effects; BY INHALATION: Central nervous system effects; Liver effects; Lung effects. Toxic effects of repeated or prolonged animal exposures include: BY SKIN OR EYE CONTACT: Kidney effects; Death; BY INHALATION: Central nervous system effects; Lower weight gain; Liver effects; Kidney effects; BY INGESTION: Weight loss; Central nervous system effects; Kidney effects; Liver effects; ****Additional animal tests have shown: Developmental toxicity at dosage levels showing maternal toxicity; No reproductive 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; BY INHALATION: Irritation of the upper respiratory passages with coughing and discomfort; BY INGESTION: Temporary nervous system depression with anaesthetic effects, e.g., dizziness, headache, confusion, incoordination, and loss of consciousness. ***In addition: BY SKIN OR EYE CONTACT: Skin permeation can occur in amounts capable of producing effects of systemic toxicity.

>>>N-Methyl-2-Pyrollidone
****Toxic effects described in animals include: BY SKIN CONTACT: No skin sensitization; BY INHALATION: Altered respiratory rate; Nonspecific effects, e.g., weight loss and irritation. Toxic effects of repeated or prolonged animal exposures include: BY INHALATION: Lethargy/inactivity; Weight loss; Bone marrow effects; Increased mortality; Testicular effects; BY INGESTION: Decreased body weight; Blood effects; Kidney tissue degeneration; Altered enzyme activity; Thyroid effects; ****Additional animal tests have shown: NMP is not carcinogenic when tested by the inhalation, skin, and "under skin" routes of administration on laboratory animals. In oral studies, NMP was not carcinogenic in rats, but produced liver tumors in mice. There was no clear dose-response relationship in the mouse study and the significance of the data is unknown. == NMP was not teratogenic (i.e. did not cause fetal developmental malformations) by skin exposure to laboratory test animals. For inhalation animal testing, NMP showed developmental delays rather than teratogenic effects. The delayed effects involved a reduction in fetal body weight, delay in physical development and limited evidence of deficits in behavioral test. The effects were found to be neither permanent nor life-threatening. == Tests have shown that NMP does not cause genetic damage in bacterial or mammalian cell cultures. It has not been tested in animals for genetic toxicity. ****Human health effects of overexposure may include: BY SKIN CONTACT: Dermatitis; Skin irritation with itching, burning, redness, swelling or rash; BY EYE CONTACT: Eye irritation with discomfort, tearing, or blurring of vision; BY INHALATION: Vapors may cause respiratory tract irritation; May cause nose and throat irritation with sneezing, sore throat or runny nose; Nonspecific discomfort, e.g., nausea, headache or weakness; BY INGESTION: Chills; May cause gastrointestinal tract irritation; Vomiting; Abdominal cramps; BY INHALATION OR INGESTION: Drowsiness; Nausea; Dizziness. ****Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN CONTACT: There are inconclusive or unverified reports of human sensitization; Rash; Blisters; Burning; Cracking; Redness; Pain; Severe irritation; Skin permeation may occur in amounts capable of producing the effects of systemic toxicity. ***In addition: No information was found to determine carcinogenic potential of NMP in humans. == One documented human case has attempted to link human stillbirth and occupational NMP exposure. This study neither proved nor disproved a causal link between NMP exposure and the stillbirth. == There are reports that low NMP exposures caused some individuals to experience eye irritation or chronic headache.

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 5mL/kg, or 350 mL for an average adult.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point	: 115 F (46 C)
Method	: 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

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.

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.).

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation.

Personal Protective Equipment

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 respitators;

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 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-Methyl-2-Pyrollidone

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

1-Methoxy-2-Propanol

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: 100 ppm, 369 mg/m3, 8 Hr. TWA STEL 150 ppm, 553 mg/m3
AEL *	()	: None Established

* AEL is '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 to Amber.
Solubility in Water	: Moderate
Odor	: Aromatic.

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal conditions.

Incompatibility with Other Materials

Avoid contact with:
Oxidizing agents; Oxygen; Strong acids; Peroxides; Strong reducing agents; Strong oxidizing agents; Strong alkalies

Decomposition

Decomposition products:
Various hydrocarbons; Carbon Dioxide (CO2); Carbon Monoxide (CO); Nitrogen oxides; Water.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

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

>>>1-Methoxy-2-Propanol
Inhalation 4 hour LC50: 15,000 ppm in rats
Skin absorption LD50: 14,000 mg/kg in rabbits
Oral LD50: 5,200 mg/kg in rats.

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

This product complies with TSCA inventory reporting requirements.

State Regulations (U.S.)

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

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)
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End of MSDS