

PI 2611

Version 2.1

Issue Date : 02/06/2018 Ref. 130000024521
Revision Date : 01/24/2018

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PI 2611
Product Use : Electrical/electronic industries
Polyimide Precursor Coating for Electronics Industry

Restrictions on use : For Industrial and Professional Use Only

Manufacturer/Supplier : Hitachi Chemical DuPont MicroSystems LLC.
250 Cheesecake Road
Parlin, New Jersey 08859

Product Information : 800-346-5656
Medical Emergency : 1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency : +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION**Product hazard category**

Flammable liquids	Category 4
Skin irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Reproductive toxicity	Category 1B
Specific target organ toxicity - single exposure	Category 3

Label content

Pictogram :



Signal word : Danger

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Hazardous warnings : Combustible liquid.
Causes skin irritation.
Causes serious eye irritation.
May cause respiratory irritation.
May damage the unborn child.

Hazardous prevention measures : Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER/doctor if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Get medical advice/ attention.
If skin irritation occurs: Get medical advice/ attention.
If eye irritation persists: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
No applicable data available.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

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Component	CAS-No.	Concentration
N-Methyl-2-pyrrolidone	872-50-4	85 - 95 %
Polyimide		10 - 20 %

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4. FIRST AID MEASURES

- General advice : No applicable data available.
- Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
- Skin contact : Wash off with soap and water. Get medical attention if irritation develops and persists. Wash contaminated clothing before re-use.
- Eye contact : Immediately flush eyes for at least 15 minutes. Get medical attention.
- Ingestion : If swallowed, DO NOT induce vomiting unless directed to do so by medical personnel. Rinse mouth with water. Call a physician or poison control centre immediately.
- Most important symptoms/effects, acute and delayed : No applicable data available.
- Protection of first-aiders : No applicable data available.
- Notes to physician : No applicable data available.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Water spray, Carbon dioxide (CO₂), Dry chemical, Foam
- Unsuitable extinguishing media : No applicable data available.

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- Specific hazards : Hazardous decomposition products formed under fire conditions. (see also section 10) Avoid breathing decomposition products.
- Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.
- Further information : Evacuate personnel to safe areas. Stop spill/release if it can be done with minimal risk. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

- Safeguards (Personnel) : Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Wear suitable protective equipment.
- Environmental precautions : Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Clean contaminated floors and objects thoroughly while observing environmental regulations.
- Spill Cleanup : Contain spill. Soak up with inert absorbent material. Collect and contain contaminated absorbent and dike material for disposal. Keep in suitable, closed containers for disposal. Ventilate the area. Clean contaminated surface thoroughly.
- Accidental Release Measures : Dispose of in accordance with local regulations.

SECTION 7. HANDLING AND STORAGE

- Handling (Personnel) : Avoid inhalation, ingestion and contact with skin and eyes. Do not use in areas without adequate ventilation. Keep container closed when not in use. Take care to avoid waste and spillage when weighing, loading and mixing the product.
Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Contaminated work clothing should not be allowed out of the workplace. Remove contaminated clothing and protective equipment before entering eating areas. Remove and wash contaminated clothing before re-use.

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Handling (Physical Aspects) : Avoid formation of dust and aerosols. Keep away from heat and sources of ignition.

Dust explosion class : No applicable data available.
Storage : Store in original container. Keep frozen. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from sources of ignition - No smoking. Do not store or consume food, drink or tobacco in areas where they may become contaminated with this material. Keep container closed when not in use. Do not reuse empty container.

Storage period : No applicable data available.

Storage temperature : -20 - -10 °C (-4 - 14 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls : Local exhaust or a laboratory hood should be used when handling the materials. Maintain air concentrations below occupational exposure standards.

Personal protective equipment
Respiratory protection : Provide adequate ventilation. No personal respiratory protective equipment normally required. Where there is potential for airborne exposures in excess of applicable limits, wear approved respiratory protection with dust/mist cartridge. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. Observe respirator use limitations specified by the manufacturer.

Hand protection : Material: Solvent-resistant gloves
Additional protection: Gloves must be inspected prior to use., Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough., As the product is a mixture of several substances, the durability of the glove materials cannot be calculated in advance and has to be tested before use., The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other., Request information on glove permeation properties from the glove supplier., Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

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- Eye protection : Wear safety glasses with side shields.
- Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.
 Lightweight protective clothing
 Safety shoes
- Protective measures : All chemical protective clothing should be visually inspected prior to use. Clothing and gloves should be replaced in case of chemical or physical damage or if contaminated.

Exposure Guidelines
 Exposure Limit Values

N-Methyl-2-pyrrolidone			
AEL *	(DuPont)	5 ppm	8 & 12 hr. TWA, Skin

Polyimide			
No applicable data available.			

Biological Exposure Indices

N-Methyl-2-pyrrolidone			
BEI	(ACGIH)	100 mg/l	5-Hydroxy-N-methyl-2-pyrrolidone/Urine Sampling time: End of shift.

* 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state : liquid
 Form : liquid
 Color : brown

Odor : amine-like

Odor threshold : No applicable data available.

pH : No applicable data available.

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Melting point/range : No applicable data available.
Boiling point/boiling range : No applicable data available.
Flash point : 93 °C
Method: closed cup
Evaporation rate : No applicable data available.
Flammability (solid, gas) : No applicable data available.
Upper explosion limit : No applicable data available.
Lower explosion limit : No applicable data available.
Vapour Pressure : No applicable data available.
Vapour density : No applicable data available.
Specific gravity (Relative density) : No applicable data available.
Water solubility : partly soluble
Solubility(ies) : No applicable data available.
Partition coefficient: n-octanol/water : No applicable data available.
Auto-ignition temperature : No applicable data available.
Decomposition temperature : No applicable data available.
Viscosity, kinematic : No applicable data available.
Viscosity, dynamic : 11,500 - 13,000 mPa.s at 25 °C (77 °F)

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No dangerous reaction known under conditions of normal use.
Chemical stability : The product is chemically stable under recommended conditions of storage, use and temperature.
Stable at normal temperatures and storage conditions.

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Possibility of hazardous reactions : Polymerization will not occur.
Conditions to avoid : Heat, flames and sparks.
Incompatible materials : Strong acids Strong bases, Strong oxidizing agents, Strong reducing agents
Hazardous decomposition products : Hazardous thermal decomposition products may include:
Carbon dioxide (CO₂), Carbon monoxide, Hydrocarbons, Formaldehyde,
Nitrogen oxides (NO_x)

SECTION 11. TOXICOLOGICAL INFORMATION

N-Methyl-2-pyrrolidone

Inhalation 4 h LC50 : > 5.1 mg/l , Rat
Target Organs: Respiratory system

Dermal LD50 : > 5,000 mg/kg , Rat

Oral LD50 : 4,150 mg/kg , Rat

Skin irritation : Severe skin irritation, human

Eye irritation : Irritation to eyes, reversing after 7 to 21 days, Rabbit

Skin sensitization : Does not cause skin sensitisation., Mouse
Information given is based on data obtained from similar substances.

Repeated dose toxicity : Ingestion
Rat
- 90 d
NOAEL: 169 mg/kg
LOAEL: 433 mg/kg Method: OECD Test Guideline 408
No toxicologically significant effects were found.

Inhalation
Rat
- 90 d
dust/mist
NOAEL: 0.5 mg/l
LOAEL: 1 mg/l Method: OECD Test Guideline 413
No toxicologically significant effects were found.

Skin contact
Rabbit

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- 20 d
 NOAEL: 826 mg/kg Method: OECD Test Guideline 410
 No toxicologically significant effects were found.

- Carcinogenicity** : Animal testing did not show any carcinogenic effects.
- Mutagenicity** : Animal testing did not show any mutagenic effects.
 Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
- Reproductive toxicity** : Animal testing showed no reproductive toxicity.
 Clear evidence of adverse effects on development, based on animal experiments.
- Teratogenicity** : Animal testing showed effects on embryo-foetal development including:
 Reduced embryo-foetal viability
 Reduced growth
 Foetal malformations
 Delayed foetal development (variations)

Polyimide

- Inhalation** : The substance is a polymer and is not expected to produce toxic effects.
- Dermal** : The substance is a polymer and is not expected to produce toxic effects.
- Oral** : The substance is a polymer and is not expected to produce toxic effects.
- Skin irritation** : No skin irritation, Rabbit

Carcinogenicity

The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition).

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

SECTION 12. ECOLOGICAL INFORMATION

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Aquatic Toxicity

N-Methyl-2-pyrrolidone

96 h LC50	:	Oncorhynchus mykiss (rainbow trout) > 500 mg/l
72 h EC50	:	Desmodesmus subspicatus (green algae) 600.5 mg/l DIN 38412
72 h NOEC	:	Desmodesmus subspicatus (green algae) 125 mg/l DIN 38412
48 h EC50	:	Daphnia magna (Water flea) 4,897 mg/l
21 d	:	NOEC Daphnia magna (Water flea) 12.5 mg/l OECD Test Guideline 211

Environmental Fate

N-Methyl-2-pyrrolidone

Bioaccumulation	:	Bioaccumulation is unlikely.
Additional ecological information	:	No data is available on the product itself.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product	:	If recycling is not practicable, dispose of in compliance with local regulations. Never place unused product down any indoor or out door drain.
Waste disposal methods - Container	:	Do not reuse empty container. Contaminated/not cleaned containers should be treated/handled like product waste. Dispose of container properly. Refer to applicable Local, State/Provincial, and Federal Regulations, as well as industry Standards.
Contaminated packaging	:	No applicable data available.

SECTION 14. TRANSPORT INFORMATION

Not classified as dangerous in the meaning of transport regulations.

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SECTION 15. REGULATORY INFORMATION

SARA 313 Regulated Chemical(s) : N-Methyl-2-pyrrolidone

PA Right to Know Regulated Chemical(s) : Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): N-Methyl-2-pyrrolidone

California Prop. 65 : WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. N-Methyl-2-pyrrolidone

SECTION 16. OTHER INFORMATION

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Contact person : HD Microsystems™, Customer Service, 800-346-5656

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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