HD MicroSystems™
An Enterprise of Hitachi Chemical and DuPont Electronics

HD 8820

Version 3.0
Revision Date 2016/05/06 Document no. 130000130812

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

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Chemicals Name : HD 8820

Recommended use of the chemical and restriction on use

Recommended use : Electrical/electronic industries
PBO Precursor Coating for Electronics Industry
Restrictions on use : For Industrial and Professional Use Only

Manufacturer or supplier's details

Company : Hitachi Chemical DuPont MicroSystems Ltd.
Street address : 4-13-1 Higashi-cho, Hitachi-shi Ibaraki, 317-8555 Japan
Telephone : 886-3-571-9270
Telefax : 886-3-571-8986

Contact person : Hitachi Chemical International Co (Taiwan) Ltd., Hsinchu, Taiwan, R.O.C

Emergency telephone number : 0800 055 119
(in case of chemical spill, fire or poisoning accident)

2. HAZARDS IDENTIFICATION

Product hazard classification

Flammable liquids : Category 4
Acute toxicity (Oral) : Category 4
Serious eye damage/eye irritation : Category 1
Reproductive toxicity : Category 1B
Specific target organ toxicity - single exposure : Category 3 (Respiratory system, Central nervous system)

Endpoints which are not classified, cannot be classified or are not applicable are not shown.

Label content

Pictogram :

Signal word : Danger

Hazardous warnings : Combustible liquid.
Harmful if swallowed.
Causes serious eye damage.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May damage fertility or the unborn child.

Precautionary statements	:	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. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth. 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. Immediately call a POISON CENTER/doctor. IF exposed or concerned: Get medical advice/attention. 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.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture

Components

Chemical name	CAS-No.	Concentration
γ-Butyrolactone (γ-Butyrolactone)	96-48-0	45 - 55%
1-Methoxy-2-propyl acetate (1-Methoxy-2-propyl acetate)	108-65-6	1 - 10%
N-Methyl-2-pyrrolidone (N-Methyl-2-pyrrolidone)	872-50-4	<1%
Ethanol (Ethanol)	64-17-5	<1%
Non regulated ingredients (Non regulated ingredients)	Trade secret	<=45%

4. FIRST AID MEASURES

First aid measures for different exposure routes

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 : If in contact with eyes: Remove contact lenses, if present and easy to do. Continue rinsing.

Ingestion : If swallowed Rinse mouth with water. Call a physician or poison control centre immediately. DO NOT induce vomiting unless directed to do so by a physician or poison control center.

Main symptoms and hazards	:	No information available.
Protection of first-aiders	:	No information available.
Notes to physician	:	No information available.

5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Dry sand, Dry chemical, Alcohol-resistant foam
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.
Specific extinguishing methods	:	No information available.
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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	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.
Methods and materials for containment and cleaning up	:	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.
Additional advice	:	Dispose of in accordance with local regulations.

7. HANDLING AND STORAGE

Handling

Technical measures/Precautions	:	Avoid contact with skin, eyes and clothing. Use sufficient ventilation to keep employee exposure below recommended limits. Wash thoroughly after handling. To avoid spills during handling keep bottle on a metal tray.
Precautions for safe handling	:	Keep away from heat and sources of ignition.

Storage

Suitable storage conditions	:	Keep frozen. Keep away from direct sunlight. Store in a manner that material is not exposed to ultra violet light. Keep in a cool, well-ventilated place. Storage period: Storage temperature: -21 - -15 ℃

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Applicable occupational exposure limits are listed below.

Chemical name	Occupational Exposure Limits	Regulation
Ethanol		
TWA	1,000 ppm 1,880 mg/m3	TW OEL (12 2003)
STEL	1,000 ppm	US ACGIH (2011)

Engineering measures : Use sufficient ventilation to keep employee exposure below recommended limits.

Biological occupational exposure limits : No information available.

Personal protective equipment

Respiratory protection : Provide adequate ventilation.
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.
Respirator with filter for organic vapour
Have available emergency self-contained breathing apparatus or full-face airline respirator when using this chemical.

Hand protection : Material: butyl-rubber
Gloves must be inspected prior to use.
Material: Natural Rubber
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
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.
The exact break through time can be obtained from the protective glove producer and this has to be observed.
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.

Eye protection : Wear safety glasses or coverall chemical splash goggles.

Skin 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

Hygiene measures : 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (Physical state, form, colour, etc.)
Physical state : liquid
Form : liquid
Colour : brown

Odour : ester-like

Odour Threshold : No information available.

pH : No information available.

Melting point/freezing point
No information available.

Initial boiling point and boiling range
Boiling point : no data available

Flash point : 74 ℃

Evaporation rate : No information available.

Flammability (solid, gas) : No information available.

Upper/lower flammability or explosive limits
Upper explosion limit : No information available.
Lower explosion limit : No information available.

Vapour pressure : No information available.

Vapour density : No information available.

Density
Density : 1.1 - 1.2 g/cm3 (25 ℃)

Solubility(ies)
Water solubility : insoluble

Partition coefficient: n-octanol/water : No information available.

Auto-ignition temperature
No information available.

Decomposition temperature : No information available.

Viscosity
Viscosity, kinematic : No information available.

Viscosity, dynamic	:	1,800 mPa.s (25 ℃)
Molecular weight	:	No information available.

10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	Decomposes on heating. The product is chemically stable under recommended conditions of storage, use and temperature.
Possibility of hazardous reactions	:	Heating can release hazardous gases. Decomposes on heating.
Conditions to avoid	:	Heat, flames and sparks. Extremes of temperature and direct sunlight.
Materials to avoid	:	Peroxides alkaline substances Powdered metal salts Strong acids and strong bases oxidizers
Hazardous decomposition products	:	Hazardous thermal decomposition products may include: Carbon dioxide (CO2), Carbon monoxide, Hydrocarbons, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral

γ-Butyrolactone	:	LD50/Rat: 1,582 mg/kg Method: OECD Test Guideline 401 Central nervous system effects
1-Methoxy-2-propyl acetate	:	LD50/Rat: 8,532 mg/kg Method: US EPA Test Guideline OPP 81-1
N-Methyl-2-pyrrolidone	:	LD50/Rat: 4,150 mg/kg Method: OECD Test Guideline 401
Ethanol	:	LD50/Rat: 10,470 mg/kg Method: OECD Test Guideline 401 Central nervous system effects

Inhalation

γ-Butyrolactone	:	An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.
N-Methyl-2-pyrrolidone	:	LC50/4 h/Rat(dust/mist): > 5.1 mg/l Method: OECD Test Guideline 403 Target Organs: Respiratory Tract Respiratory tract irritation
Ethanol	:	LC50/4 h/Rat(vapour): 124.7 mg/l Method: OECD Test Guideline 403 Necrosis (tissue death), Nasal or ocular discharge, Respiratory effects

Dermal

γ-Butyrolactone	:	LD50/Guinea pig: 5,640 mg/kg
1-Methoxy-2-propyl acetate	:	LD50/Rabbit: > 5,000 mg/kg Method: OECD Test Guideline 402
N-Methyl-2-pyrrolidone	:	LD50/Rat: > 5,000 mg/kg

Method: OECD Test Guideline 402

Ethanol : LD50/Rabbit: 17,100 mg/kg
Information given is based on data obtained from similar substances.

Skin corrosion/irritation

γ-Butyrolactone : Species: Rabbit
Result: No skin irritation
Classification: No skin irritation

1-Methoxy-2-propyl acetate : Species: Rabbit
Result: No skin irritation
Classification: Not classified as irritant
Method: OECD Test Guideline 404

N-Methyl-2-pyrrolidone : Species: Rabbit
Result: No skin irritation
Classification: No skin irritation
Method: OECD Test Guideline 404
Minimal effects that do not meet the threshold for classification.

Ethanol : Species: Rabbit
Result: No skin irritation
Classification: No skin irritation
Method: OECD Test Guideline 404

Serious eye damage/eye irritation

γ-Butyrolactone : Species: Rabbit
Result: Irreversible effects on the eye
Classification: Risk of serious damage to eyes.

1-Methoxy-2-propyl acetate : Species: Rabbit
Result: No eye irritation
Classification: Not classified as irritant
Method: OECD Test Guideline 405

N-Methyl-2-pyrrolidone : Species: Rabbit
Result: Irritation to eyes, reversing after 7 to 21 days
Classification: Irritating to eyes.
Method: OECD Test Guideline 405

Ethanol : Species: Rabbit
Result: Irritation to eyes, reversing after 7 to 21 days
Classification: Irritating to eyes.
Method: OECD Test Guideline 405

Respiratory or skin sensitisation

γ-Butyrolactone : Species: Mouse
Result: Does not cause skin sensitisation.
Classification: Does not cause skin sensitisation.
Method: OECD Test Guideline 429

1-Methoxy-2-propyl acetate : Species: Guinea pig
Result: Does not cause skin sensitisation.
Classification: Does not cause skin sensitisation.
Method: OECD Test Guideline 406

N-Methyl-2-pyrrolidone : Local lymph node test
Species: Mouse
Result: Does not cause skin sensitisation.
Classification: Does not cause skin sensitisation.
Method: OECD Test Guideline 429

Ethanol : Species: Mouse
Result: Does not cause skin sensitisation.
Classification: Does not cause skin sensitisation.

Method: OECD Test Guideline 429

Germ cell mutagenicity

γ-Butyrolactone	:	Animal testing did not show any mutagenic effects. Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others. Did not cause genetic damage in cultured bacterial cells.
1-Methoxy-2-propyl acetate	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
N-Methyl-2-pyrrolidone	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.
Ethanol	:	Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Carcinogenicity

γ-Butyrolactone	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects.
1-Methoxy-2-propyl acetate	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects. Information given is based on data obtained from similar substances.
N-Methyl-2-pyrrolidone	:	Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.
Ethanol	:	No evidence of carcinogenicity in animal studies. Overall weight of evidence indicates that the substance is not carcinogenic.

Reproductive toxicity

γ-Butyrolactone	:	Reproductive toxicity: No reliable data are available. Teratogenicity: Animal testing showed no developmental toxicity.
1-Methoxy-2-propyl acetate	:	Reproductive toxicity: No toxicity to reproduction Animal testing showed effects on reproduction at levels equal to or above those causing parental toxicity. Information given is based on data obtained from similar substances. Teratogenicity: Evidence suggests the substance is not a developmental toxin in animals. Information given is based on data obtained from similar substances.
N-Methyl-2-pyrrolidone	:	Reproductive toxicity: Presumed human reproductive toxicant Animal testing showed effects on reproduction at levels equal to or above those causing parental toxicity. Reduced fertility Teratogenicity: Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity. Reduced embryo-foetal viability Foetal malformations
Ethanol	:	Reproductive toxicity: No toxicity to reproduction Evidence suggests the substance is not a reproductive toxin in animals. Teratogenicity: Evidence suggests the substance is not a developmental toxin in animals.

Specific Target Organ Toxicity

Specific target organ toxicity - single exposure

γ-Butyrolactone	:	Likely route of exposure: Ingestion

Target Organs: Central nervous system
The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with narcotic effects.

1-Methoxy-2-propyl acetate : The substance or mixture is not classified as specific target organ toxicant, single exposure.

N-Methyl-2-pyrrolidone : Target Organs: Respiratory Tract
The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

Ethanol : The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ toxicity - repeated exposure

γ-Butyrolactone : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

1-Methoxy-2-propyl acetate : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

N-Methyl-2-pyrrolidone : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Ethanol : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

γ-Butyrolactone : No aspiration toxicity classification
N-Methyl-2-pyrrolidone : No aspiration toxicity classification
Ethanol : No aspiration toxicity classification

Other

γ-Butyrolactone : Repeated dose toxicity:
Oral/Rat 90 d
NOAEL: 225 mg/kg
No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for classification., Reduced body weight gain

1-Methoxy-2-propyl acetate : Repeated dose toxicity:
Inhalation/Rat 24 Months vapour
NOAEL: 1.1 mg/l
LOAEL: 3.69 mg/l
Method: see user defined free text
No toxicologically significant effects were found.

N-Methyl-2-pyrrolidone : Repeated dose toxicity:
Oral/Rat
Method: OECD Test Guideline 408
No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for classification., Reduced body weight gain
Inhalation/Rat
No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for classification., Respiratory irritation
Dermal/Rabbit
Method: OECD Test Guideline 410
No toxicologically significant effects were found.

Ethanol	:	Repeated dose toxicity: Ingestion/Mouse 90 d NOAEL: 17,000 mg/kg Method: OECD Test Guideline 408 No toxicologically significant effects were found. Inhalation/Rat 28 d vapour NOAEL: 11.5 mg/l No toxicologically significant effects were found.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Acute and prolonged toxicity to fish

γ-Butyrolactone	:	LC50/96 h/Leuciscus idus (Golden orfe): 316 mg/l Method: DIN 38412
1-Methoxy-2-propyl acetate	:	LC50/96 h/Oncorhynchus mykiss (rainbow trout): > 100 mg/l Method: OECD Test Guideline 203
N-Methyl-2-pyrrolidone	:	LC50/96 h/Oncorhynchus mykiss (rainbow trout): > 500 mg/l
Ethanol	:	LC50/96 h/Pimephales promelas (fathead minnow): 14,200 mg/l

Toxicity to aquatic plants

γ-Butyrolactone	:	EC50/72 h/Desmodesmus subspicatus (green algae): > 1,000 mg/l
1-Methoxy-2-propyl acetate	:	ErC50/96 h/Pseudokirchneriella subcapitata (green algae): > 1,000 mg/l Method: OECD Test Guideline 201 NOEC/96 h/Pseudokirchneriella subcapitata (green algae): > 1,000 mg/l Method: OECD Test Guideline 201
N-Methyl-2-pyrrolidone	:	ErC50/72 h/Desmodesmus subspicatus (green algae): 600.5 mg/l NOEC/72 h/Desmodesmus subspicatus (green algae): 125 mg/l
Ethanol	:	ErC50/72 h/Algae: 275 mg/l Method: OECD Test Guideline 201 NOEC/5 d/Algae: 3,240 mg/l

Acute toxicity to aquatic invertebrates

γ-Butyrolactone	:	EC50/48 h/Daphnia magna (Water flea): > 500 mg/l Method: Directive 67/548/EEC, Annex V, C.2.
1-Methoxy-2-propyl acetate	:	EC50/48 h/Daphnia magna (Water flea): > 500 mg/l
Ethanol	:	EC50/48 h/Ceriodaphnia dubia (water flea): 5,012 mg/l

Chronic toxicity to fish

1-Methoxy-2-propyl acetate	:	NOEC/14 d/Oryzias latipes (Orange-red killifish): 47.5 mg/l Method: OECD Test Guideline 204
Ethanol	:	NOEC/30 d/Fish (unspecified species): 245 mg/l

Chronic toxicity to aquatic Invertebrates

1-Methoxy-2-propyl acetate	:	NOEC/21 d/Daphnia magna (Water flea): > 100 mg/l Method: OECD Test Guideline 211
N-Methyl-2-pyrrolidone	:	NOEC/21 d/Daphnia magna (Water flea): 12.5 mg/l Method: OECD Test Guideline 211

Persistence and degradability

γ-Butyrolactone	:	Result: Biodegradable
1-Methoxy-2-propyl acetate	:	Result: rapidly biodegradable
N-Methyl-2-pyrrolidone	:	Exposure time: 28 d Biodegradation: 73 %

Result: Biodegradable
Ethanol : Result: Biodegradable

Bioaccumulation
γ-Butyrolactone : Bioaccumulation is unlikely.
N-Methyl-2-pyrrolidone : Accumulation in aquatic organisms is unlikely.
Ethanol : Bioaccumulation is unlikely.

Mobility in soil
No information available.

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods : Dispose of in accordance with local regulations. Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities. Never place unused product down any indoor or out door drain. 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 : Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

Not classified as dangerous in the meaning of transport regulations.

IMDG
UN number : Not applicable
UN proper shipping name : Not applicable
Transport hazard class : Not applicable
Packing group : Not applicable
Marine pollutant : Not applicable

IATA
UN number : Not applicable
UN proper shipping name : Not applicable
Transport hazard class : Not applicable
Packing group : Not applicable

Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises : Not applicable

15. REGULATORY INFORMATION

Occupational Health & Safety Installation Regulation
Regulation of Labeling and Hazard Communication of Dangerous and Harmful Chemicals
Standards on Workplace Atmosphere of Dangerous and Hazardous Materials
Rules on Road Traffic Safety
Criteria Governing Methods of and Facilities for Storage, Clearance and Disposal of Industrial Wastes
Public Hazardous Materials and Flammable Pressurized Gases Establishment Standards and Safety Control Regulations

16. OTHER INFORMATION

References
SDS Number: 130000130812

Department

Name	:	Asia Pacific Regulatory Group
Telephone	:	+61 2 9923 6111

Responsible/issuing person

Responsible Department	:	Regulatory Affairs

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Significant change from previous version is denoted with a double bar.

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