 PRODUCT NAME: OIR 620-10

1. PRODUCT AND COMPANY IDENTIFICATION

REVISION DATE: 01-09-2005
SUPERCEDES: 03-29-2004
MSDS NO: 01836
SYNONYMS: None
CHEMICAL FAMILY: Organic mixture
DESCRIPTION / USE: Positive photoresist
FORMULA: Not applicable/Mixture

FUJIFILM ELECTRONIC MATERIALS U.S.A., INC. 80 CIRCUIT ROAD NORTH KINGSTOWN, RI 02852

2.  COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS or CHEMICAL NAME</th>
<th>CAS #</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl lactate</td>
<td>97-64-3</td>
<td>55 - 70</td>
</tr>
<tr>
<td>Novolac resin</td>
<td>PMN-93-241</td>
<td>5 - 15</td>
</tr>
<tr>
<td>Ethyl-3-ethoxypropionate</td>
<td>763-69-9</td>
<td>5 - 15</td>
</tr>
<tr>
<td>Novolak polymer, reaction products with naphthoquinone diazide ester</td>
<td>Proprietary</td>
<td>2 - 12</td>
</tr>
<tr>
<td>Naphthoquinone diazide ester derivative</td>
<td>LVE-97-0011</td>
<td>2 - 10</td>
</tr>
<tr>
<td>Substituted phenol</td>
<td>Proprietary</td>
<td>0 - 10</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

OSHA Hazard Classification: combustible liquid, eye irritant, skin irritant, respiratory irritant, central nervous system depressant

Routes of Entry: Inhalation, skin, eyes, ingestion
Chemical Interactions: No known interactions
Medical Conditions Aggravated: None known or reported

Human Threshold Response Data
Odor Threshold:
- Ethyl lactate: detection: 0.801 ppm, recognition: 1.42 ppm
- Propanoic acid, 3-ethoxy-, ethyl ester: detection: 0.07 ppm, recognition: = 0.1 ppm

Irritation Threshold: Not established

Hazardous Materials Identification System/National Fire Protection Association Classifications

<table>
<thead>
<tr>
<th>Hazard Ratings:</th>
<th>Health</th>
<th>Flammability</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMIS</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>NFPA</td>
<td>Not established</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Immediate (Acute) Health Effects
- Inhalation Toxicity: Not expected to be toxic by inhalation. Inhalation of high concentrations may result in central nervous system (CNS) effects such as dizziness, weakness, fatigue, nausea, headache, and lack of coordination.
- Inhalation Irritation: High concentrations may be slightly irritating to the eyes, nose, throat, and lungs.
- Skin Contact: Skin contact may cause moderate irritation consisting of transient redness and swelling. This irritant effect would not be expected to result in permanent damage. Prolonged skin contact may cause a yellow discoloration if not properly washed off.
- Eye Contact: Contact may cause moderate irritation consisting of transient redness, swelling, and mucous membrane discharge to the conjunctiva. No corneal involvement or visual impairment is expected.
- Ingestion Irritation: Ingestion may cause irritation of the gastrointestinal tract and gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting, lethargy or diarrhea.
- Ingestion Toxicity: Not expected to be toxic by ingestion unless large amounts are swallowed.

Acute Target Organ Toxicity: Central nervous system, Eyes, Skin, Respiratory Tract

Prolonged (Chronic) Health Effects
- Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA.
- Reproductive and Developmental Toxicity: Not known or reported to cause reproductive or developmental toxicity.

Inhalation: There are no known or reported effects from chronic exposure except for effects similar to those experienced from acute exposure.
- Skin Contact: Dermal contact may cause defatting of skin and/or dermatitis.
- Ingestion: There are no known or reported effects from chronic ingestion except for effects similar to those experienced from single exposure.

Chronic Target Organ Toxicity: Skin
Supplemental Health Hazard Information: No additional health information available.

4. FIRST AID MEASURES
Inhalation: IF INHALED: Remove individual to fresh air. If respiratory irritation develops, call a physician.

Skin Contact: IF ON SKIN: Immediately flush skin with plenty of water for 15 minutes. If clothing comes in contact with the product, the clothing should be removed immediately and laundered before re-use. Seek medical attention.

Eyes: IF IN EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Seek medical attention immediately.

Ingestion: IF SWALLOWED: Immediately drink water to dilute. Consult a physician if symptoms develop. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flammability Summary (OSHA): Combustible.

Flammable Properties
Flash Point: Approximately 53 Deg. C. / Approximately 127 Deg. F.
Autoignition Temperature: No data
Upper Flammable/Explosive Limit, % in air: No data
Lower Flammable/Explosive Limit, % in air: No data

Fire/Explosion Hazards: Vapors may be ignited by sparks, flames or other sources of ignition if material is above the flash point giving rise to a flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Dust may be ignitable if mixed with air in the presence of an ignition source.

Extinguishing Media: Use alcohol foam, carbon dioxide, dry chemical or water spray when fighting fires.

Fire Fighting Instructions: In case of fire, use normal fire fighting equipment including a NIOSH approved self-contained breathing apparatus (SCBA). Use water to cool containers.

Hazardous Combustion Products: Oxides of nitrogen, Carbon monoxide, Carbon dioxide

6. ACCIDENTAL RELEASE MEASURES

Personal Protection for Emergency Situations: Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to boots, impervious gloves, hard hat, splash-proof goggles, impervious clothing, i.e., chemically impermeable suit, self-contained breathing apparatus.

Spill Mitigation Procedures
Air Release: Hazardous concentrations in air may be found in local spill area and immediately downwind. Vapors may be suppressed by the use of water fog. Contain all liquid for treatment and/or disposal as a (potential) hazardous waste.

Water Release: This material is slightly soluble in water. Notify all downstream users of possible contamination. Divert water flow around spill if possible and safe to do so. Contain all liquid for treatment and/or disposal as a (potential) hazardous waste. Continue to handle as described in land spill.

Land Release: Create a dike or trench to contain materials. Do not place spill materials back in their original containers. Absorb spill with inert material (e.g., dry sand, clay, earth or commercial absorbent), then place in a chemical waste container. Decontaminate all clothing and the spill area using a detergent and flush with large amounts of water.
Additional Spill Information: Remove all sources of ignition. Stop source of spill as soon as possible and notify appropriate personnel. Utilize emergency response personal protection equipment prior to the start of any response. Evacuate all non-essential personnel. Dispose of spill residues per guidelines under Section 13, Disposal Consideration. This material may be neutralized for disposal.

7. HANDLING AND STORAGE

Handling: Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water. Avoid breathing (dust, vapor, mist, gas). Keep container closed when not in use. Ground and bond containers when transferring material.

Storage: Store in a cool dry ventilated location, away from sources of ignition or other incompatible conditions and chemicals. Keep container(s) closed. Outside or detached storage is preferred. Store in a tightly closed container. Contents may develop pressure upon prolonged storage. Use caution when opening. Do not allow out-of-date product to accumulate. Do not expose to direct light.

Shelf Life Limitations: See label or certificate of analysis for shelf life if applicable.

Incompatible Materials for Storage: Refer to Section 10, "Incompatible Materials."

Do Not Store At temperatures Above: 10 Deg. C. 50 Deg. F.
Do Not Store At Temperatures Below: 4 Deg. C. 39.2 Deg. F.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Local exhaust ventilation or other engineering controls are normally required when handling or using this product to keep exposure to airborne contaminants below the TLV, PEL, or other recommended exposure limit and/or maintain operator comfort. Use explosion-proof ventilation equipment when handling this product.

Protective Equipment for Routine Use of Product

Respiratory Protection: Wear a NIOSH approved respirator if any exposure occurs.
Respirator Type(s): A NIOSH approved air purifying respirator with organic vapor cartridge. Air purifying respirators should not be used in oxygen deficient or IDLH atmospheres or if exposure concentrations exceed ten (10) times the published limit.

Skin: Wear impervious gloves to avoid skin contact. Follow good industrial hygiene practices.

Eyes: Use chemical goggles.

Protective Clothing Type: Impervious

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>OSHA PEL / STEL</th>
<th>ACGIH LIMITS</th>
<th>AIHA WEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl 3-ethoxypropanoate</td>
<td>763-69-9</td>
<td>None established</td>
<td>None established</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

Ethyl 3-ethoxypropanoate: Manufacturer recommends 50ppm (8hr TWA); 100ppm STEL.

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>NIOSH Immediately Dangerous to Life or Health:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The IDLH has not been established for this product.</td>
<td></td>
</tr>
</tbody>
</table>

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9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Solution</td>
</tr>
<tr>
<td>Color</td>
<td>yellow red</td>
</tr>
<tr>
<td>Odor</td>
<td>mild ester-like</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Not Applicable/Mixture</td>
</tr>
<tr>
<td>pH</td>
<td>(@ 25 Deg. C) Not applicable</td>
</tr>
<tr>
<td>Octanol/Water Coeff</td>
<td>No data</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Slight</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>No data</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>No data</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>&gt; 1.00 (air =1)</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>(@ 25 Deg. C) No data</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No data</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>No data</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>No data</td>
</tr>
<tr>
<td>Volatiles, % by vol.</td>
<td>65 - 80 %</td>
</tr>
<tr>
<td>VOC Content %/w/w / lbs/gal</td>
<td>72.50 / 6.04</td>
</tr>
<tr>
<td>HAP Content %/w/w / lbs/gal</td>
<td>0.00 / 0.00</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Stability and Reactivity Summary</th>
<th>Stable under normal conditions. May become unstable at elevated temperatures and/or pressure. Static discharge may cause ignition at temperatures at or above the flash point. Not sensitive to mechanical shock.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactive Properties</td>
<td>Combustible</td>
</tr>
<tr>
<td>Hazardous Polymerization</td>
<td>Will not occur</td>
</tr>
<tr>
<td>Conditions to Avoid</td>
<td>Sparks, open flame, other ignition sources, and elevated temperatures.</td>
</tr>
<tr>
<td>Chemical Incompatibility</td>
<td>strong oxidizing agents</td>
</tr>
<tr>
<td>Hazardous Decomposition Products</td>
<td>carbon dioxide, carbon monoxide, oxides of nitrogen, Formaldehyde, Cresols, Lactic acid, ethanol</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>&gt; 50 Deg. C. &gt; 122 Deg. F.</td>
</tr>
<tr>
<td>Product May Be Unstable At Temperatures Above</td>
<td>10 Deg. C. 50 Deg. F.</td>
</tr>
</tbody>
</table>

11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Component Animal Toxicology</th>
<th>Oral LD50 value: Oral LD50: Rat &gt; 5 g/kg</th>
<th>Oral LD50: Male rat &gt; 5 g/kg</th>
<th>Oral LD50: Female rat = 4.3 g/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl lactate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propanoic acid, 3-ethoxy-, ethyl ester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal LD50 value: Ethyl lactate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal LD50 value: Propanoic acid, 3-ethoxy-, ethyl ester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhalation LC50 value:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propanoic acid, 3-ethoxy-, ethyl ester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Animal Toxicity:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral LD50 value: Rat Believed to be</td>
<td>4 - 5 g/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal LD50 value: Rabbit Believed to be</td>
<td>&gt; 2 g/kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Inhalation LC50 value: No data
Skin Irritation: This material is expected to be moderately irritating.
Eye Irritation: This material is expected to be moderately irritating.

Reproductive and Developmental Toxicity: Not known or reported to cause reproductive or developmental toxicity.
Component Data: Ethyl lactate
This chemical has been tested in laboratory animals and no evidence of teratogenicity was seen.
Propanoic acid, 3-ethoxy-, ethyl ester
This material has been tested in laboratory animals and no evidence of teratogenicity or embryotoxicity was seen.

Mutagenicity: This material was non-mutagenic in the Ames test.
Component Data: Ethyl lactate
This chemical did not show mutagenic activity when tested in the Salmonella/Mammalian Microsome Plate Incorporation Mutagenicity Assay.
Novolac resin
This product has been shown to be non-mutagenic based on a battery of assays.
Propanoic acid, 3-ethoxy-, ethyl ester
This material was non-mutagenic in the Ames test.
Naphthoquinone diazide esters of a polynuclear cyclic compound
This material was non-mutagenic in the Ames test.

Carcinogenicity: This chemical is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP, or EPA.

12. ECOLOGICAL INFORMATION

Ecological Toxicity Values:
Ethyl lactate 96 hr. LC50: = 100 - 1000 ppm
Propanoic acid, 3-ethoxy-, ethyl ester Fathead minnow, 96 hr. LC50: = 65 mg/l.
Water flea (Daphnia magna), 96 hr. LC50: > 100 mg/l.

13. DISPOSAL CONSIDERATIONS

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

Waste Disposal Summary: Spent or discarded material is a hazardous waste.
Potential US EPA Waste Codes: D001
Disposal Methods: As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by incineration.
Components subject to land ban restrictions: Ethyl lactate (D001)
Ethyl 3-ethoxy propionate (D001)
14. TRANSPORT INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT Description (49 CFR 172.101):

Land (U.S. DOT): COMBUSTIBLE LIQUID, N.O.S., (CONTAINS ETHYL LACTATE, ETHYL 3-ETHOXYPROPIONATE), NA1993, PGIII

Air (IATA/ICAO): FLAMMABLE LIQUID, N.O.S., (ETHYL LACTATE, ETHYL 3-ETHOXYPROPIONATE), 3, UN1993, PGIII

Water (IMO): FLAMMABLE LIQUID, N.O.S., (ETHYL LACTATE, ETHYL 3-ETHOXYPROPIONATE), 3.3, UN1993, PGIII

Flash Point: (C) 53

Hazard Label/Placard:

(Primary) LAND: NONE

AIR/WATER: FLAMMABLE LIQUID

Emergency Response Guide Number: 128

15. REGULATORY INFORMATION

UNITED STATES:

Toxic Substances Control Act (TSCA): The components of this product are either listed on the Toxic Substances Control Act Chemical Substances Inventory or are introduced into commerce in accordance with the provisions of a low volume PMN exemption notification.

Pesticide acceptance indication: US EPA Registration Number: Not applicable

Superfund Amendments and Reauthorization Act (SARA) Title III:

Hazard Categories Sections 311/312 (40 CFR 370.2):

Health: Acute

Physical: Fire


Extremely Hazardous Substance Section 302 - Threshold Planning Quantity:

Not applicable

Reportable Quantity (40 CFR 302.4):

None listed

Supplier Notification Requirements (40 CFR 372.45), 313 Reportable Components

No 313-listed chemicals in this product

Clean Air Act VOC Section 111

Ethyl lactate

Ethyl 3-ethoxypropanoate

State Right-to-Know Regulations Status of Ingredients

Pennsylvania: Ethyl lactate

New Jersey: Ethyl lactate

Massachusetts: Ethyl lactate

16. OTHER INFORMATION
THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. FUJIFILM ELECTRONIC BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION BUT, MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MSDS IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT FUJIFILM ELECTRONIC MATERIALS AT THE PHONE NUMBER 1-800-553-6546 (CUSTOMER SERVICE) TO MAKE CERTAIN DOCUMENT IS CURRENT.