1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Code 33830
Trade Name UVIII-0.5 PHOTO RESIST
Manufacturer/Supplier Shipley Company
Address 455 Forest St.
          Marlborough, Massachusetts 01752
Phone Number (508) 481-7950
Emergency Phone Number (508) 481-7950
Chemtrec # (800) 424-9300
MSDS first issued 2 July 1996
MSDS data revised 16 April 1998
Prepared By: Amy C. Nichols
Local Sales Company Shipley Company, 455 Forest Street, Marlboro, MA 01752
          (508-481-7950)

2. COMPOSITION/INFORMATION ON THE INGREDIENTS

Components in Product
Component Name CAS# / Codes Concentration
ethyl lactate 97-64-3 87.00 - 88.00
Acrylic Copolymer 10.00 - 20.00
Organic Siloxane Surfactant 0.01 - 1.00
Aromatic Sulfur Compound < 1.00

3. HAZARD IDENTIFICATION

Main Hazards - Irritant - Combustible - Skin - Eye - Nervous System - Respiratory System
Routes of Entry Inhalation, ingestion, eye and skin contact, absorption.
Carcinogenic Status Not considered carcinogenic by NTP, IARC and OSHA
Target Organs - Skin - Eye - Nervous System - Respiratory System
Health Effects - Eyes Liquid or vapor may cause slight transient irritation.
Health Effects - Skin Material may cause slight irritation on prolonged or repeated contact. Repeated or prolonged contact may produce defatting of the skin leading to irritation and dermatitis.
Health Effects - Ingestion Swallowing may have the following effects:
3. HAZARD IDENTIFICATION

Health Effects - Inhalation
Exposure to vapor at high concentrations may have the following effects:
- drowsiness - irritation of nose, throat and respiratory tract

4. FIRST AID MEASURES

First Aid - Eyes
Immediately flush the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.

First Aid - Skin
Wash skin with water. Obtain medical attention if blistering occurs or redness persists.

First Aid - Ingestion
Wash out mouth with water. Obtain medical attention.

First Aid - Inhalation
Remove from exposure. If there is difficulty in breathing, give oxygen. Seek medical attention if symptoms persist.

Advice to Physicians
Treat symptomatically.

5. FIRE FIGHTING MEASURES

Extinguishing Media
Use water spray, foam, dry chemical or carbon dioxide. Keep containers and surroundings cool with water spray.

Special Fire-Fighting Procedures
This product may give rise to hazardous vapors in a fire. Vapors can travel a considerable distance to a source of ignition and result in flashback.

Unusual Fire & Explosion Hazards
Pressure may build up in closed containers with possible liberation of combustible vapors.

Protective Equipment for Fire-Fighting
Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures
Contain and absorb using earth, sand or other inert material. Transfer into suitable containers for recovery or disposal. Finally flush area with plenty of water.
6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Wear appropriate protective clothing. Wear respiratory protection. Eliminate all sources of ignition.

Environmental Precautions
Prevent the material from entering drains or water courses.

7. HANDLING AND STORAGE

Handling
Use local exhaust ventilation. Avoid contact with eyes, skin and clothing. Keep container tightly closed when not in use.

Storage
Store in original containers. Store away from sources of heat or ignition. Storage area should be:
- cool
- dry
- well ventilated
- out of direct sunlight

Other
None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Standards
ethyl lactate
None assigned.

Engineering Control Measures
Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (local exhaust), and control of process conditions.

Respiratory Protection
Respiratory protection if there is a risk of exposure to high vapor concentrations. The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.

Hand Protection
Butyl rubber gloves.

Eye Protection
Chemical goggles.

Body Protection
Normal work wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State
Liquid

Color
Clear

Odor
Sweet
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC (g/l)</td>
<td>910.76</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.04</td>
</tr>
<tr>
<td>pH</td>
<td>Neutral</td>
</tr>
<tr>
<td>Boiling Range/Point (°C/F)</td>
<td>154 / 309</td>
</tr>
<tr>
<td>Flash Point (PMCC) (°C/F)</td>
<td>48.9 / 120</td>
</tr>
<tr>
<td>Explosion Limits (%)</td>
<td>ethyl lactate: Lower limit 1.6%</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Partially soluble.</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>Heavier than air.</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Slower than ether</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Ethyl Lactate: 2.0 mmHg at 20 °C.</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Category</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability</td>
<td>Stable under normal conditions.</td>
</tr>
<tr>
<td>Conditions to Avoid</td>
<td>- High temperatures - Static discharge</td>
</tr>
<tr>
<td>Incompatibilities</td>
<td>- Oxidizing agents - Bases - Acids</td>
</tr>
<tr>
<td>Hazardous Polymerization</td>
<td>Will not occur.</td>
</tr>
<tr>
<td>Hazardous Decomposition Products</td>
<td>- carbon monoxide - Carbon Dioxide - Acrylics - oxides of nitrogen</td>
</tr>
</tbody>
</table>

11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Category</th>
<th>Information</th>
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</thead>
<tbody>
<tr>
<td>Acute Data</td>
<td>ethyl lactate: Oral LD50 (mouse) 2500mg/kg.</td>
</tr>
<tr>
<td>Chronic/Subchronic Data</td>
<td>No data.</td>
</tr>
<tr>
<td>Genotoxicity</td>
<td>No adverse effects are expected.</td>
</tr>
<tr>
<td>Reproductive/Developmental Toxicity</td>
<td>No adverse reproductive effects were observed in experimental animals.</td>
</tr>
<tr>
<td>Additional Data</td>
<td>None known.</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Category</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>No relevant studies identified.</td>
</tr>
</tbody>
</table>
12. **ECOLOGICAL INFORMATION**

- **Persistece/Degradability**: Ethyl lactate: COD = 0.00166g/g.
- **Bio-accumulation**: Product is not expected to bioaccumulate.
- **Ecotoxicity**: Ethyl lactate: Tests on the following species gave a 48h EC50 of 683mg/litre:
  - daphnia

13. **DISPOSAL CONSIDERATIONS**

- **Product Disposal**: Incineration is the recommended method of disposal. Dispose of in accordance with all applicable local and national regulations.
- **Container Disposal**: Labels should not be removed from containers until they have been cleaned. Empty containers may contain hazardous residues. Dispose of containers with care.

14. **TRANSPORT INFORMATION**

- **DOT Ground**: Not Regulated per 49 CFR 173.150(f)(2)
- **UN Proper Shipping Name**: Ethyl Lactate Solution
- **UN Class**: (3) Flammable Liquid
- **UN Number**: UN1192
- **UN Packaging Group**: III
- **N.O.S. 1**: Not applicable.
- **N.O.S. 2**: Not applicable.
- **Subsidiary Risks**: None.
- **ADR/RID Substance Identification Number**: CLASS 3 - 31(c)
- **CERCLA RQ**: None.
- **Marine Pollutant**: No.

15. **REGULATORY INFORMATION**

- **TSCA Listed**: Yes
- **TSCA Exemptions**: D.2.B B.3
- **WHMIS Classification**: D.2.B B.3
- **MA Right To Know Law**: All components have been checked for inclusion on the
15. REGULATORY INFORMATION

Massachusetts Substance List (MSL). Those components present at the de minimus concentration have been identified in the hazardous ingredients section of the MSDS.

California Proposition 65

This product contains the following chemicals that have been found by the State of California to cause cancer, birth defects or other reproductive harm:
- Toluene (trace)

SARA TITLE III-Section 311/312 Categorization (40 CFR 370)

Immediate, delayed, flammability hazard

SARA TITLE III-Section 313 (40 CFR 372)

This product does not contain a chemical which is listed in Section 313 at or above de minimis concentrations.

16. OTHER INFORMATION

NFPA Rating- FIRE 2
NFPA Rating- HEALTH 2
NFPA Rating- REACTIVITY 0
NFPA Rating- SPECIAL None.

Revisions Highlighted
Boiling Range/Point (°C/F)
Flash Point (PMCC) (°C/F)

Abbreviations
CAS#: Chemical Abstract Services Number
ACGIH: American Conference of Governmental Industrial Hygienists
OSHA: Occupational Safety and Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit
NTP: National Toxicology Program
IARC: International Agency for Research on Cancer
R: Risk
S: Safety
LD50: Lethal Dose 50%
LC50: Lethal Concentration 50%
BOD: Biological Oxygen Demand
TLm: Median Tolerance Limit

Disclaimer
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16. OTHER INFORMATION

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data. Shipley Company and its agents disclaim all liability for any action taken or foregone on reliance
upon such data.