1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Code: 13220
Trade Name: Shipley BPR100 Photoresist
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: 13 December 2001
MSDS data revised: Environmental, Health & Safety Department
Prepared By: Shipley Company, 455 Forest Street, Marlboro, MA 01752
(508-481-7950)

2. COMPOSITION/INFORMATION ON THE INGREDIENTS

Components without CAS numbers are Trade Secret

<table>
<thead>
<tr>
<th>Component Name</th>
<th>CAS# / Codes</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic grade propylene glycol</td>
<td>107-98-2</td>
<td>&lt; 40.00</td>
</tr>
<tr>
<td>monomethyl ether</td>
<td></td>
<td></td>
</tr>
<tr>
<td>other esters</td>
<td></td>
<td>&lt; 10.00</td>
</tr>
<tr>
<td>Acrylate ester</td>
<td></td>
<td>&lt; 15.00</td>
</tr>
<tr>
<td>acrylic copolymer dye</td>
<td></td>
<td>&lt; 40.00</td>
</tr>
<tr>
<td>residual acrylate monomer</td>
<td></td>
<td>&lt; 1.00</td>
</tr>
<tr>
<td>Alicyclic ketone</td>
<td></td>
<td>&lt; 5.00</td>
</tr>
<tr>
<td>ethyl acrylate</td>
<td>140-88-5</td>
<td>&lt; 1.00</td>
</tr>
</tbody>
</table>

3. HAZARD IDENTIFICATION

Main Hazards: - Combustible - Irritant - Carcinogen - Sensitizer - Skin - Eye - Respiratory System - Nervous System - Kidney - Liver

Routes of Entry: Inhalation, ingestion, eye and skin contact, absorption.

Carcinogenic Status: Listed as carcinogenic by NTP and IARC.

Target Organs: - Skin - Eye - Respiratory System - Nervous System - Liver - Kidney

Health Effects - Eyes: Liquid or vapor may cause pain, transient irritation and superficial corneal effects.

Health Effects - Skin: Material may cause slight irritation on prolonged or repeated contact. Repeated and/or prolonged contact may lead to: - drowsiness - liver damage - kidney damage - central nervous system depression - allergic
3. HAZARD IDENTIFICATION

Health Effects - Ingestion
A large dose may have the following effects:
- drowsiness - liver damage - kidney damage - central nervous system depression - delayed nerve and eye damage

Health Effects - Inhalation
Exposure to vapor at high concentrations may have the following effects:
- irritation of nose, throat and respiratory tract - liver damage - kidney damage - central nervous system depression - allergic sensitization

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. Continue washing for at least 15 minutes. Obtain medical attention if blistering occurs or redness persists.

First Aid - Ingestion
Wash out mouth with water. Have victim drink 1-3 glasses of water to dilute stomach contents. Do not induce vomiting. Obtain medical attention. Never administer anything by mouth if a victim is losing consciousness, is unconscious or is convulsing.

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

<table>
<thead>
<tr>
<th>Spill Procedures</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Precautions</td>
<td>Wear appropriate protective clothing. Wear respiratory protection. Eliminate all sources of ignition.</td>
</tr>
<tr>
<td>Environmental Precautions</td>
<td>Prevent the material from entering drains or water courses.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Occupational Exposure Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic grade propylene glycol monomethyl ether</td>
</tr>
<tr>
<td>residual acrylate monomer</td>
</tr>
<tr>
<td>Alicyclic ketone</td>
</tr>
<tr>
<td>ethyl acrylate</td>
</tr>
</tbody>
</table>

| 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. |
8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Hand Protection  Butyl rubber gloves. Other chemical resistant gloves may be recommended by your safety professional.
Eye Protection  Chemical goggles.
Body Protection  Normal work wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Blue</td>
</tr>
<tr>
<td>Odor</td>
<td>Acrylate</td>
</tr>
<tr>
<td>VOC (g/l)</td>
<td>398</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.05</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling Range/Point</td>
<td>120/248</td>
</tr>
<tr>
<td>Flash Point (PMCC)</td>
<td>38.9/102</td>
</tr>
<tr>
<td>Explosion Limits (%)</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Insoluble</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>Propylene Glycol Monomethyl Ether: 12.5 mmHg at 25 °C.</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability  Stable under normal conditions.
Conditions to Avoid  - contact with incompatible materials - Static discharge - High temperatures - Exposure to direct sunlight - freezing temperatures
Incompatibilities  - Strong oxidizing agents - Strong reducers - Strong acids - Strong bases - Free radical initiators - Inert gas - Oxygen scavengers - UV Radiation
Hazardous Polymerization  Will not occur.
Hazardous Decomposition Products  - carbon monoxide - carbon dioxide - oxides of nitrogen - acrylate monomers

11. TOXICOLOGICAL INFORMATION

Acute Data  Propylene Glycol Monomethyl Ether: Oral LD50 (rat) 7200mg/kg. Dermal LD50 (rabbit) 13000mg/kg.
11. TOXICOLOGICAL INFORMATION

Alicyclic ketone: Oral LD50 (rat) 1800mg/kg. Dermal LD50 (rat) >2000mg/kg. Application to rabbit skin produced no sign of dermal irritation. Single application to the rabbit eye produced no signs of ocular irritation. Substance has shown no evidence of skin sensitization potential.

Chronic/Subchronic Data

Acrylate ester: Skin contact may result in allergic sensitization.

Ethyl acrylate: IARC assessment: this product is possibly carcinogenic to humans (Group 2B). NTP assessment: this product is reasonably anticipated to be a human carcinogen.

Genotoxicity

Propylene glycol monomethyl ether: The product did not exhibit mutagenic activity in the following systems (with and without metabolic activation): - Chinese hamster ovary cells No significant mutagenic response was observed and the carcinogenic potential of the material is therefore considered to be low.

Alicyclic ketone: It was not mutagenic when tested in bacterial or mammalian systems.

Reproductive/Developmental Toxicity

Propylene glycol monomethyl ether: Inhalation teratology testing of this solvent (with less than 3% beta isomer) revealed no maternally toxic, teratogenic or fetotoxic responses in rats or rabbits exposed to concentrations as high as 1,500 ppm. Concentrations reaching nearly 3,000 ppm produced maternal toxicity in rats. When maternal toxicity occurred slight fetotoxicity but no teratogenicity was also observed in these animals. These effects were not observed in rabbits exposed to this dose level.

Propylene glycol monomethyl ether: Dermal teratology testing of this solvent (with less than 3% beta isomer) revealed no maternally toxic, teratogenic or fetotoxic responses in rats or rabbits exposed to concentrations of 1,000 and 2,000 mg/kg per day.

Additional Data

None known.

12. ECOLOGICAL INFORMATION

Mobility

No relevant studies identified.

Persistence/Degradability

No relevant studies identified.

Bio-accumulation

No relevant studies identified.

Ecotoxicity

Propylene glycol monomethyl ether: Tests on the following species
12. ECOLOGICAL INFORMATION

gave a LC50 of 20800mg/litre:  - fathead minnows
Tests on the following species gave a LC50 of 23300mg/litre:  - daphnia

Alicyclic ketone:  Tests on the following species gave a 96 h LC50 of 9 ppm:  - zebra fish
Tests on the following species gave a 24 h EC50 of 15 ppm:  - 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  Resin solution
UN Class  (3) Flammable Liquid
UN Number  UN1866
UN Packaging Group  III
N.O.S. 1:  None.
N.O.S. 2:  None.
Subsidiary Risks  None.
CERCLA RQ  None.
Marine Pollutant  No.

15. REGULATORY INFORMATION

TSCA Listed  All components of this product are listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory) or are exempted from listing because a Low Volume Exemption has been granted in accordance with 40 CFR 723.50.

TSCA Exemptions  TSCA Sec.12(b) Export Notification
This product does not contain any substances subject to Section 12(b) export notification.

WHMIS Classification  B.3, D.2.A.
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:  - ethyl acrylate
15. REGULATORY INFORMATION

SARA TITLE III-Section 311/312 Categorization (40 CFR 370)
Immediate, delayed, flammability hazard

SARA TITLE III-Section 313 (40 CFR 372)
This product contains a chemical which is listed in Section 313 at or above de minimis concentrations. The following listed chemicals are present (quantity present is found elsewhere on this MSDS): - ethyl acrylate (140-88-5)

16. OTHER INFORMATION

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

Revisions Highlighted

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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