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**Research and Development Sample  
To Be Used By Technically Qualified Personnel For R&D Uses Only**

**MATERIAL SAFETY DATA SHEET**

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June 29, 2005

**SECTION 1. CHEMICAL IDENTIFICATION -----**

CHEMICAL NAME: Organic Resin Solution  
TRADE NAME: XP MicroSpray™ Positive Photoresist Spray  
PRODUCT #: MSP0013

**SECTION 2. COMPOSITION-----**

INGREDIENTS: 1-methoxy-2-propanol acetate (CAS: 108-65-6); 50-90%  
Synonym: propylene glycol monomethyl ether acetate  
Mixed Cresol Novolac Resin < 30%  
Cresol (CAS: 1319-77-3); < 0.9%  
Diazo Photoactive Compound; < 10%  
Fluoroaliphatic Polymer Esters; (CAS: 11114-17-3) < 1.0%  
Dimethyl ether; (CAS: 115-10-6); 10-20%

**SECTION 3. HAZARD DATA-----**

INFLAMMABILITY: Flammable Aerosol. Contents under pressure.  
SKIN CONTACT: Short term exposure – Irritation (possibly severe). Prolonged or repeated exposure may have the following effects: Drowsiness; defatting and drying of the skin, which can lead to irritation and dermatitis; central nervous system depression; kidney damage or liver damage.  
EYE CONTACT: Short term exposure – Irritation (possibly severe). May cause pain, transient irritation and superficial corneal effects  
INGESTION: Swallowing may have the following effects: irritation of mouth, throat and digestive tract, headache, nausea, vomiting. Repeated doses may have the following effects: central nervous system depression, liver damage or kidney damage.  
INHALATION: Inhalation may have the following effects: irritation of nose, throat and respiratory tract. Higher concentrations may have the following effects: systemic effects similar to those resulting from ingestion.  
MUTAGENICITY: No significant mutagenic response observed.  
CARCINOGENICITY: Not considered carcinogenic by NTP, IARC, and OSHA  
TARGET ORGANS: Eye, Respiratory System, Nervous System, Liver, Kidney and Skin

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**SECTION 4. FIRST AID MEASURES**

**INHALATION:** Remove to fresh air. If patient has stopped breathing, give artificial respiration. Contact physician immediately.  
**INGESTION:** If substantial amounts are swallowed, have patient drink large amounts of water and INDUCE VOMITING. Contact a physician immediately.  
**SKIN CONTACT:** Rinse with water. Remove contaminated clothing and shoes. Wash skin with soap and water. If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115F; 41-46 C). DO NOT USE HOT WATER.  
**EYE CONTACT:** Rinse immediately with water, flush for 15 min. Contact a physician.

**SECTION 5. FIRE FIGHTING MEASURES**

**EXTINGUISHING MEDIA:** Water, dry chemical, carbon dioxide, and foam.  
**SPECIAL FIRE FIGHTING PRECAUTIONS:** Wear self-contained breathing apparatus (SCBA) and personal protective equipment when exposed to products of combustion.  
**FIRE & EXPLOSION HAZARDS:** Severe fire hazard. Vapor/air mixtures are explosive. Containers may rupture or explode is exposed to heat. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion. Severe explosion hazard.

**SECTION 6. ACCIDENTAL RELEASE PROCEDURES**

**EVACUATION PROCEDURES & SAFETY:** Wear appropriate protective gear for the situation. See Personal Protection information in Section 8. Eliminate all sources of ignition. Do not breathe vapors or dust.  
**CLEANUP & DISPOSAL OF SPILL:** Absorb with an inert absorbent. Sweep up and place in an appropriate closed container. Use clean, non-sparking tools to collect absorbed material.  
**ENVIRONMENTAL & REGULATORY REPORTING:** Do not flush to drain. If required proper authorities should be notified.

**SECTION 7. STORAGE AND HANDLING PRECAUTIONS**

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STORAGE: Store in original, well-closed container in a cool dry place.  
 HANDLING: Keep away from heat, sparks, and flames.  
 Avoid breathing vapors.  
 Use with adequate ventilation.  
 Avoid contact with skin, eyes, and clothing. Have available safety shower and eyewash.  
 Wear impervious butyl or nitrile gloves.  
 Wash with soap and water after handling.

**SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION**-----

RESPIRATORY PROTECTION: In case of large spills, use of self-contained breathing apparatus (SCBA) is recommended as narcosis may occur.  
 VENTILATION: General mechanical ventilation is sufficient under normal conditions.  
 SKIN PROTECTION: Impervious butyl or nitrile gloves are recommended.  
 EYE PROTECTION: Safety goggles are recommended.

**SECTION 9. PHYSICAL AND CHEMICAL DATA**-----

APPEARANCE: Viscous yellow to amber liquid under pressure  
 ODOR: Sweet odor  
 BOILING POINT: -24 °C (-11 °F)  
 SPECIFIC GRAVITY: 1.0- 1.1  
 VAPOR PRESSURE: 3982 mm Hg @ 20 °C (68 °F)  
 H<sub>2</sub>O SOLUBILITY: 7.6%  
 % VOLATILES: 65% by wt  
 EVAPORATION RATE: 0.39 (BuAc = 1)  
 FLASH POINT: -41 °C (-42 °F) CC  
 AUTOIGNITION TEMP: 350 °C (662 °F)  
 FLAMIBILITY LIMITS: 3.4% lower  
 27.0% upper

**SECTION 10. REACTIVITY DATA** -----

REACTIVITY: May form explosive peroxides. Avoid prolonged storage or contact with air, light or storage and use above room temperature.  
 INCOMPATIBILITY: Oxidizing Agents, Combustible materials  
 HAZARDOUS POLYMERIZATION: Will not occur

**HAZARDOUS COMBUSTION OR**

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DECOMPOSITION PRODUCTS: Carbon Monoxide, Carbon Dioxide, Phenols,  
Nitrogen Oxides, Aldehydes, acrid smoke, irritating  
fumes

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## SECTION 11. TOXICITY HAZARDS

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### ACUTE EFFECTS:

May be harmful if swallowed, inhaled, or absorbed through the skin.  
Readily absorbed through the skin. No significant signs of any health hazard are expected to occur through skin absorption. Irritating to eyes and respiratory tract. May cause burning, tearing, redness or swelling. Vapor or mist is irritating to the eyes, mucous membranes and upper respiratory tract. Prolonged and/or repeated exposure can cause gastric or nervous system effects. To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Component: Electronic grade propylene glycol monomethyl ether acetate

Acute oral toxicity LD50 rat 8,532 mg/kg

Component: Cresol

Acute oral toxicity LD50 rat 2,737 mg/kg

Component: Fluoroaliphatic Polymer Esters

Acute oral toxicity LD50 rat > 10,000 mg/kg

Component: Electronic grade propylene glycol monomethyl ether acetate

Acute inhalation LC50 rat 6 h 23.49 mg/l  
toxicity

Component: Cresol

Acute inhalation LC50 rat 8 h 35.38 mg/l  
toxicity

Component: Electronic grade propylene glycol monomethyl ether acetate

Acute dermal toxicity LD50 rabbit >5,000 mg/kg

Component: Cresol

Acute dermal toxicity LD50 rabbit > 5,000 mg/kg

Component: Fluoroaliphatic Polymer Esters

Acute dermal toxicity > 5,000 mg/kg

Component: Electronic grade propylene glycol monomethyl ether acetate

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Toxicity to reproduction

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.

Component: Electronic grade propylene glycol monomethyl ether acetate

Mutagenicity

No significant mutagenic response was observed and the carcinogenic potential of the material is therefore considered to be low.

Component: Cresol

Toxicity to reproduction

Developmental effects were seen in laboratory animals only at dose levels that were maternally toxic.

SECTION 12. ECOLOGICAL INFORMATION-----

Electronic grade propylene glycol monomethyl ether acetate

Ecotoxicity effects

Toxicity to fish LC50 Fathead minnow (*Pimephales promelas*) 96 h  
161 mg/l

Toxicity to aquatic EC50 *Daphnia magna* 48 h  
invertebrates >500 mg/l

SECTION 13. DISPOSAL CONSIDERATIONS-----

Comply with applicable local, state or international regulations regarding the proper disposal of this material and/or containers.

SECTION 14. TRANSPORTATION INFORMATION-----

HAZARD CLASSIFICATION: Flammable Aerosol  
SHIPPING NAME: Aerosol, Flammable  
UN NUMBER: UN 1950

SECTION 15. REGULATORY INFORMATION-----

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HAZARDOUS LISTINGS: All ingredients appear on the TSCA Inventory of Chemical Substances.  
SARA Title III: This product IS NOT subject to SARA Title III, Section 313 Reporting Requirements.  
Calif. SCAQMD Rule 443.1 VOC's: 969 g/l; vapor pressure 3982 mm Hg @ 20 °C.

SECTION 16. ADDITIONAL PRECAUTIONS AND COMMENTS-----

National Fire Protection Association Hazard Ratings – NFPA:

- 2 Health Hazard Rating
- 4 Flammability Rating
- 1 Reactivity Rating

To the best of our knowledge, the above information is believed to be accurate but does not claim to be all-inclusive and is intended to be used only as a guide. The supplier makes no warranty of any kind, expressed or implied, concerning the use of this product and shall not be held liable for any damage resulting from handling or from contact with the above product. User assumes all risks incident to its use.

MSDS Revision Information:

- A) General update of MSDS. Correct Transportation information in Section 14.