SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

CHEMICAL NAME: Organic Polymer Solution
TRADE NAME: 495 PMMA Series Resists in Chlorobenzene
Positive Radiation Sensitive Resists
PRODUCT #: See Table 1 – Section 9
SUPPLIER: MicroChem Corporation
90 Oak Street, PO Box 426
Newton, MA 02464-0002
TELEPHONE: (617) 965-5511
FAX: (617) 965-5818
CHEMTREC USA EMERGENCY #: (800) 424-9300
CHEMTREC INTL EMERGENCY #: (703) 527-3887
MSDS DATE: 06 November 2008
REVISION DATE: 18 December 2008

SECTION 2. HAZARDS IDENTIFICATION

Hazardous Classification
Acute hazards aquatic env – Category 2
Acute toxicity (oral) - Category 4
Acute toxicity (inhalation – gas/vapour) – Category 4
Aspiration Hazard – Category 2
Flammable liquids - Category 3
Serious eye damage/eye irritation - Category 2A
Skin corrosion/irritation - Category 2
Target organ systemic toxicant repeat exp – Category 2
Target organ systemic toxicant single exp - Category 3

Signal Word: WARNING!

Hazards
Toxic to aquatic life.
Flammable liquid and vapour
Causes serious eye irritation.
Causes skin irritation.
Harmful if inhaled.
Harmful if swallowed.
May be harmful if swallowed and enters airways.
May cause damage to organs through prolonged or repeated exposure.
May cause drowsiness and dizziness.
May cause respiratory irritation.
SAFETY DATA SHEET

CHEMICAL NAME: Organic Polymer Solution
TRADE NAME: 495 PMMA Series Resists in Chlorobenzene
              Positive Radiation Sensitive Resists
PRODUCT #: See Table 1 – Section 9

Precautions
Avoid release to the environment.
Use only outdoors or in a well-ventilated area.
Do not breathe mist or vapors.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Keep away from heat, sparks and open flame. - No smoking.
Use explosion-proof equipment.
Wear protective gloves and eye/face protection.
Take precautionary measures against static discharge.
In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
DO NOT induce vomiting.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Take off contaminated clothing as wash before re-use.
Rinse mouth.
Call a POISON CENTRE or doctor/physician if you feel unwell.
Is skin irritation or rash occurs, seek medical advice/attention.
Use extinguishing measures that are appropriate to local circumstances

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS: Monochlorobenzene (CAS: 108-90-7); 88-99%
              (See Table 1 – Section 9)
              Poly(methylmethacrylate) (CAS: 9011-14-7); 1-12%

SECTION 4. FIRST AID MEASURES

INHALATION: If inhaled, remove to fresh air. Contact a poison control center,
emergency room or physician right away as further treatment will be necessary.

INGESTION: DO NOT induce vomiting. Gently wipe or rinse the inside of the
mouth with water. Sips of water may be given if person is fully
conscious. Never give anything by mouth to an unconscious or
convulsing person. Contact a poison control center, emergency room
or physician right away as further treatment will be necessary.

SKIN CONTACT: Run a gentle stream of water over the affected area for 15 minutes. A
mild soap may be used if available. Contact a poison control center,
emergency room or physician right away as further treatment will be
necessary.

EYE CONTACT: Pour a gentle stream of warm water through the affected eye for at
least 15 minutes. Contact a poison control center, emergency room or
physician right away as further treatment will be necessary.
SAFETY DATA SHEET

CHEMICAL NAME: Organic Polymer Solution
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Positive Radiation Sensitive Resists
PRODUCT #: See Table 1 – Section 9

SECTION 5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Dry chemical, carbon dioxide.
SPECIAL FIRE FIGHTING PRECAUTIONS: Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Remove all ignition sources if it can be done safely.
UNUSUAL FIRE OR EXPLOSION HAZARDS: Emits toxic fumes under fire conditions. Can decompose to toxic, corrosive hydrogen chloride and possible traces of phosgene. Heat will build pressure and may rupture closed containers. Keep containers cool with water spray. Vapor may travel a considerable distance to source of ignition and flash back.

SECTION 6. ACCIDENTAL RELEASE MEASURES

EVACUATION PROCEDURES & SAFETY: Wear appropriate protective gear for the situation. See Personal Protection information in Section 8.
CLEANUP & DISPOSAL OF SPILL: Absorb with an inert absorbent. Sweep up and place in an appropriate closed container (see Section 7). Clean up residual material by washing area with water. Collect washings for disposal.
ENVIRONMENTAL & REGULATORY REPORTING: Do not flush to drain. If required proper authorities should be notified.

SECTION 7. HANDLING AND STORAGE

PRECAUTIONS: Store container tightly closed in well-ventilated place.
STORAGE: Store in tightly closed container in a cool environment away from direct sunlight. Do not store in aluminum containers.
HANDLING: Use only under yellow light.
Keep away from heat, sparks, and flames.
Use only with mechanical exhaust.
Do not contact with skin, eyes, and clothing. Severe eye irritant.
Avoid prolonged or repeated contact with skin.
Do not breathe vapors or mist.
Have safety shower and eye wash available.
Store and transfer under a blanket of dry inert gas.
SAFETY DATA SHEET

CHEMICAL NAME: Organic Polymer Solution
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Positive Radiation Sensitive Resists
PRODUCT #: See Table 1 – Section 9

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS: Monochlorobenzene: ACGIH TLV: 10 ppm 8hr TWA, A3. OSHA: PEL: 75 ppm (350 mg/m3) 8 hr TWA.

RESPIRATORY PROTECTION: Under normal conditions, use of air-purifying (half-mask/full-face) respirator with cartridges/canisters approved for use against organic vapors, dust, mists and fumes is recommended.

VENTILATION: General area dilution/exhaust or local ventilation.

SKIN PROTECTION: Impervious (Viton®, PVA) gloves are highly recommended.

EYE PROTECTION: Safety goggles are highly recommended.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear, colorless liquid
ODOR: Mild, mothball-like
BOILING POINT: 132 °C (270 °F)
SPECIFIC GRAVITY: 1.11
VAPOR PRESSURE: 11.8 mm @ 20 °C (68 °F)
VAPOR DENSITY: 3.9 (air=1)
H₂O SOLUBILITY: 0.05% @ 30 °C, by wt.
EVAPORATION RATE: NA
FLASH POINT: 28 °C (82 °F) TCC
AUTOIGNITION TEMP: 638 °C (1180 °F)
EXPLOSION LIMITS: 1.3% lower
7.1% upper

Table 1

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SAFETY DATA SHEET

CHEMICAL NAME: Organic Polymer Solution
TRADE NAME: 495 PMMA Series Resists in Chlorobenzene
Positive Radiation Sensitive Resists
PRODUCT #: See Table 1 – Section 9

SECTION 10. STABILITY AND REACTIVITY

STABILITY: Stable
INCOMPATIBILITY: Strong Oxidizing Agents, Strong Acids, Aluminum,
Potassium, Sodium, Magnesium.
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS: Carbon Monoxide, Carbon Dioxide, Hydrogen Chloride
and possible traces of Phosgene.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Symptoms of Exposure: Causes severe eye irritation. Causes skin irritation. May cause upper respiratory tract irritation, central nervous system depression, shortness of breath, drowsiness and confusion. Prolonged, repeated contact may cause adverse effects to central nervous system, liver, kidney, blood and thyroid. Harmful or fatal if swallowed and aspirated into lungs. Small amounts of product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, including death.

Acute Toxicity
Acute Oral Toxicity
Component: Monochlorobenzene
LD50 rat 1110 mg/kg

Acute Dermal Toxicity
Component: Monochlorobenzene
LD50 rabbit >7940 mg/kg

Acute Inhalation Toxicity
Component: Monochlorobenzene
LC50 rat 13.9 mg/l

Specific Concentration Limits
The values listed below represent the percentages of ingredients of unknown toxicity:
12% Acute oral toxicity
12% Acute dermal toxicity
12% Acute inhalation toxicity

Skin corrosion/irritation
Component: Monochlorobenzene
Acute Skin Irritation: Causes irritation to skin in rabbit studies.

Serious eye damage/eye irritation
Component: Monochlorobenzene
Acute Eye Irritation: Causes irritation to eyes in rabbit studies
SAFETY DATA SHEET

CHEMICAL NAME: Organic Polymer Solution
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Respiratory or Skin Sensitisation
Component: Monochlorobenzene
Skin sensitization – not a sensitizer in guinea pig studies

Carcinogenicity
Component: Monochlorobenzene
Classified as an A3 carcinogen by ACGIH. Animal studies have equivocal results.

Germ Cell Mutagenicity
Component: Monochlorobenzene
Ames Test – negative with and without metabolic activation.

Specific Target Organ Systemic Toxicity (single exposure)
Component: Monochlorobenzene
Central Nervous system

Specific Target Organ Systemic Toxicity (repeated exposure)
Component: Monochlorobenzene
Central Nervous System, Liver, Kidney, Blood, Thyroid

Toxicity to Reproduction
Component: Monochlorobenzene
No adverse effects to reproduction or adverse developmental have occurred in laboratory animal studies. Effects were seen only at maternally toxic doses.

Aspiration Hazards
Harmful or fatal if swallowed and aspirated into lungs.

SECTION 12. ECOLOGICAL INFORMATION

Acute aquatic toxicity

Acute toxicity to fish
Component: Monochlorobenzene
24-96 hr LC50 fish: 4.1 – 10.5 mg/L

Acute toxicity to aquatic invertebrates
Component: Monochlorobenzene
24 hr EC50 Daphnia magna: 4.3 mg/L

Acute toxicity to algae
Component: Monochlorobenzene
96 hr EC50 Algae 12.5 mg/l

Specific concentration limits
The values listed below represent the percentages of ingredients of unknown toxicity.
12% Acute aquatic toxicity – fish
12% Acute aquatic toxicity – aquatic invertebrates
12% Acute aquatic toxicity - algae
SAFETY DATA SHEET

CHEMICAL NAME: Organic Polymer Solution
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PRODUCT #: See Table 1 – Section 9

Chronic aquatic toxicity

Chronic toxicity to fish
No data found

Chronic toxicity to aquatic invertebrates
No data found

Chronic toxicity to algae
No data found

Persistence/ Degradability
Component: Monochlorobenzene
Expected to biodegrade

Bioaccumulation
Component: Monochlorobenzene
Not expected to bioaccumulate

Mobility
Component: Monochlorobenzene
Environmental transport studies predict if monochlorobenzene were emitted to air it would tend to remain in the atmosphere and undergo photodegradation.

SECTION 13. DISPOSAL CONSIDERATIONS

Precautions
CONTAINERS MAY BE HAZARDOUS WHEN EMPTY. Since emptied containers retain product residue follow all MSDS and label warnings even after container is emptied. Dispose of contents/container in accordance with local regulation.

Disposal
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 Liquid
SHIPPING NAME: Resin Solution
UN NUMBER: UN 1866
PACKING GROUP III

SECTION 15. REGULATORY INFORMATION

US AND INTERNATIONAL INFORMATION
Chemical Inventories:
TSCA (US) – Listed.
EINECS/ELINCS/NLP (EU) – Listed.
China – Listed.
Japan – Listed.
DSL/NDSL (Canada) – Listed.
SAFETY DATA SHEET

Rev. Date: 18 December 2008

CHEMICAL NAME: Organic Polymer Solution
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PRODUCT #: See Table 1 – Section 9

AICS (Australia) – Listed.
Korea - Listed
Philippines – Listed.

SARA Title III: This product IS subject to SARA Title III, Section 313
               Reporting Requirements as chlorobenzene.

CERCLA Reportable Quantity: 100 lbs as chlorobenzene

Calif. SCAQMD Rule 443.1 VOC's: 1107 g/l; vapor pressure 11.8 mm Hg @ 20°C

SECTION 16. OTHER INFORMATION-----------------------------------------------

National Fire Protection Association Hazard Ratings – NFPA:

            3  Health Hazard Rating
            3  Flammability Rating
            0  Reactivity Rating

For additional information contact: productsafety@microchem.com

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: Revised GHS precaution phrases