MATERIAL SAFETY

DATA SHEET PAGE 1 27 August 2001 SECTION 1. CHEMICAL IDENTIFICATION

Polymer Solution TRADE NAME: NANO/ LOR B Series Resists PRODUCT #: See Table 1 – Section 9

SECTION 2. INGREDIENTS

HAZARDOUS INGREDIENTS: Cyclopentanone (CAS: 120-92-3); 65-90%. Propylene glycol methyl ether (CAS: 107-98-2); 10-15% OTHER INGREDIENTS: Polyaliphatic imide copolymer (CAS: 123209-67-6); 1-20% Proprietary Dye, 0.1 - 2%

SECTION 3. PHYSICAL AND CHEMICAL PROPERTIES

VEL: 340 (air=1) H20 SOLUBILITY: 40-50% @ 20 oC, by wt. % VAPOROLARITY: See Table 1 below VAPOR PRESSURE: 9 mm @ 20 oC (68 oF) VAPOR DENSITY: 2.3 (air=1) TCC AUTOIONIZATION TEMPERATURE: 136 oC (278 oF) EXPLOSION LIMITS: 1.6 lower unk. Upper Table 1 Name Product # Specific Gravity Volatiles (% by wt) VOC (g/L) LOR 1B 9331670 0.967 97 95000 LOR 2B 93316704.973 96 9250 LOR 38 93316707 0.989 94915 LOR 5B 9331670 0.982 92 9050 LOR 6B 93316709 0.984 91 9000 LOR 7B 93316714 0.980 99 9350 LOR 10B 93316711 0.990 88 8800 LOR 15B 93316712 0.993 88 8700 LOR 20B 93316715 1.002 88 8550 LOR 30B 93316716 1.004 85 8400 LOR 50B 93316719 1.007 82 8200 SECTION 10. REACTIVITY DATA

STABILITY: Stable INCOMPATIBILITY: Strong Oxidizing Agents, Strong Bases, Strong Reducing Agents, Acid Chlorides, Acid Anhydrides HAZARDOUS POLYMERIZATION: Will not occur HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS: Carbon Monoxide, Carbon Dioxide

SECTION 4. FIRST AID MEASURES

HAZARDS------------------------------------------------------------------- ACUTE EFFECTS: May be harmful if swallowed, inhaled, or absorbed through the skin. Irritating to eyes and respiratory tract. May cause serious damage to the eyes. Vapor or mist is irritating to the eyes, mucous membranes and upper respiratory tract. May cause serious damage to the eyes. May cause serious damage to the eyes. If inhaled, remove to fresh air. If patient has stopped breathing, give artificial respiration. If breathing is difficult give oxygen. Contact physician immediately. INGESTION: Induce vomiting. Wash out mouth with water if conscious. Get medical attention immediately. SKIN CONTACT: Rinse with water for 15 minutes while removing contaminated clothing and shoes. Wash affected area with soap and water. Wash contaminated clothing. EYE CONTACT: Rinse immediately with water, flush for 15 min. lifting eyelids frequently. Get emergency medical assistance. SECTION 5. FIRE FIGHTING MEASURES-----------------------------------------------------------

SECTION 6. ACCIDENTAL RELEASE PROCEDURES

EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, and foam. SPECIAL FIRE FIGHTING PRECAUTIONS: Wear self-contained breathing apparatus (SCBA) and personal protective equipment to prevent contact with skin and eyes. UNUSUAL FIRE OR EXPLOSION HAZARDS: Vapor may travel considerable distance to source of ignition and flash back. Heat will build pressure and may rupture closed containers. Forms explosive mixtures in air. Keep containers cool with water spray. Evacuate Area. Eliminate all ignition sources. Wear self-contained breathing apparatus (SCBA), rubber boots, and heavy rubber gloves. Avoid eye or skin contact. Cover with dry absorbent material and collect in closed container for disposal using non-sparking tools. Ventilate area and wash spill sites after material pickup is complete, rinse with water. All clean up should be carried out in accordance with federal, state, and local regulations. If required proper authorities should be notified. SECTION 7. STORAGE AND HANDLING PRECAUTIONS-------------------------------------------------------------

STORAGE: Store in tightly closed container in a cool environment away from direct sunlight. HANDLING: Keep away from heat, sparks, and flames. Do not breathe vapors. Use only with mechanical exhaust. Do not contact with skin, eyes, and clothing. Severe eye irritant. Avoid prolonged or repeated exposure. Wear heavy rubber gloves. Wash with soap and water after handling. Have safety shower and eye wash available.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION----------------------- RESPIRATORY PROTECTION: In case of spills, use of self-contained breathing apparatus (SCBA) is recommended. VENTILATION: Local or general mechanical ventilation is required. SKIN PROTECTION: Heavy rubber gloves are highly recommended. EYE PROTECTION: Safety goggles are highly recommended. SECTION 9. PHYSICAL AND CHEMICAL DATA

APPEARANCE: Pale yellow ODOT: Slightly boiling POINT: 118-131 °C (244-268 °F) SPECIFIC GRAVITY: See Table 1 below VAPOR PRESSURE: 9 mm @ 20 °C (68 °F) VAPOR DENSITY: 2.3 (air=1) H2O SOLUBILITY: 40-50% @ 20 °C, by wt. % VAPOROLARITY: See Table 1 below FLASH POINT: 30 °C (87 °F) TCC AUTOIONIZATION TEMPERATURE: 136 °C (278 °F) EXPLOSION LIMITS: 1.6 lower unk. Upper Table 1 Name Product # Specific Gravity Volatiles (% by wt) VOC (g/L) LOR 1B 9331670 0.967 97 95000 LOR 2B 93316704.973 96 9250 LOR 38 93316707 0.989 94915 LOR 5B 9331670 0.982 92 9050 LOR 6B 93316709 0.984 91 9000 LOR 7B 93316714 0.980 99 9350 LOR 10B 93316711 0.990 88 8800 LOR 15B 93316712 0.993 88 8700 LOR 20B 93316715 1.002 88 8550 LOR 30B 93316716 1.004 85 8400 LOR 50B 93316719 1.007 82 8200 SECTION 10. REACTIVITY DATA

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SECTION 11. TOXICITY HAZARDS----------------------------------------------------------------------------------------------------- ACUTE EFFECTS: May be harmful if swallowed, inhaled, or absorbed through the skin. Irritating to eyes and respiratory tract. May cause serious damage to the eyes. Vapor or mist is irritating to the eyes, mucous membranes and upper respiratory tract. Eye and skin contact can cause headache, nausea, vomiting, dizziness, weakness, drowsiness, narcosis, and loss of coordination in humans. Causes moderate skin irritation in rabbits. Prolonged and/or repeated exposure can cause absorption of harmful amounts of material. ORAL: LD50 (mam): 2000 mg/Kg as Cyclopentanone LD-50 (rat): 5660 mg/kg as Propylene glycol methyl ether IRRITATION: skin: 500 mg - mild as Cyclopentanone skin: 500 mg: as Propylene glycol methyl ether: 100 mg/ 4 sec - severe as Cyclopentanone eyes: 230 mg – mild as Propylene glycol methyl ether TLV: ACGIH (TWA) none established PEL: OSHA (8hr TWA) none established SECTION 12. ECOLOGICAL DATA

As cyclopentanone: Data not available. As Propylene glycol methyl ether: It has a low potential to affect aquatic organisms, a high potential to biodegrade with unacclimated microorganisms from activated sludge, a low potential to affect secondary waste treatment microbial respiration, a low potential to persist in the environment, and a low potential to bioconcentrate. The direct instantaneous discharge to a receiving body of water of an amount of this chemical which will rapidly produce, by dilution, a final concentration of 250 mg/l or less is not expected to cause adverse environmental effects. Oxygen Demand Data: Acute Aquatic Effects Data: ThOD: 1.95 g oxygen/g 48-h EC-50 (daphnia): 23,300 mg/L COD: 1.84 g oxygen/g 96-h LC-50 (fathead minnow): 20,800 mg/L BOD-20: 1.14-g oxygen/g Biodegradation: A 28 day test for ready biodegradability using unacclimated microorganisms showed 73.4% degradation of the test article as measured by carbon dioxide evolution and a loss of dissolved organic carbon. Secondary Waste Treatment Effects: A 3 hour activated sludge respiration inhibition test showed an EC-50 of >1000 mg/L. SECTION 13. DISPOSAL CONSIDERATIONS----------------------------------------------------------------------------------------------------- Burn in an EPA-licensed chemical incinerator equipped with an afterburner and scrubber at an approved waste disposal facility. Observe all federal, state, and local environmental regulations. SECTION 14. TRANSPORTATION INFORMATION----------------------------------------------------------------------------- HAZARD CLASSIFICATION: Flammable Liquid SHIPPING NAME: Resin Solution UN NUMBER: UN 1866 PACKING GROUP III SECTION 15. REGULATORY INFORMATION----------- HAZARDOUS LISTINGS: All ingredients appear on the TSCA Inventory of Chemical Substances, EINECS, and the Japan Hazardous Chemical Listing. SARA Title III: This product IS NOT subject to SARA Title III, Section 313 Reporting Requirements. California: SCAGMD Rule 443.1 VOC's: See Table 1 – Section 9 SECTION 16. ADDITIONAL PRECAUTIONS AND COMMENTS----------------------------------------------------------------------------------------------------- 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. MATERIAL