BREWER SCIENCE INC.
MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet has been prepared to comply with the EC Directive, Canadian WHMIS and the OSHA Hazard Communication Standard.

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SECTION 1: IDENTIFICATION

Product Name: ARC-XLT; ARC XL-20; ARC XLT-750, ARC XLT-400

Manufacturer: Brewer Science, Inc.
2401 Brewer Drive
Rolla, MO 65401

Information Phone Number: (573) 364-0300 Fax: (573) 368-3318
Emergency Phone Number: (800) 255-3924
MSDS Date of Preparation: 1/31/97

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SECTION 2: HAZARDOUS COMPONENTS

Component	CAS#	%	Exposure Limits
Cyclohexanone	108-94-1	50-65	50 ppm PEL-TWA 25 ppm TLV-TWA skin
n-Methyl-2-pyrrolidone	872-50-4	30-40	None Established (PEL/TLV) 100 ppm (recommended)
Polymer solids	Proprietary	1-10	None Established (PEL/TLV)
Dye solids	Proprietary	1-10	None Established (PEL/TLV)

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SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Flammable Liquid and Vapor. May cause eye and skin irritation. Inhalation of vapors may cause mucous membrane and respiratory irritation, headache, dizziness, nausea and other symptoms of central nervous system depression. Prolonged overexposure may cause liver and kidney damage.

Potential Health Effects:

Eye: May cause moderate irritation with pain, redness and blurred vision.

Skin: May cause redness, irritation, swelling, cracking and dryness. Prolonged or repeated exposure may cause defatting and dermatitis. Cyclohexanone and n-methyl-2-pyrrolidone are absorbed through the skin causing effects similar to those described under inhalation.

Inhalation: Inhalation of vapors, mists or aerosols may cause mucous membrane and respiratory irritation and abdominal pain. Central nervous system depression with symptoms of headache, dizziness, nausea, drowsiness and unconsciousness may also occur.

Ingestion: Swallowing may cause central nervous system depression with headache, nausea, dizziness and unconsciousness; gastrointestinal irritation, abdominal pain and injury to the lungs, liver and brain.

Chronic Hazards: Chronic absorption of cyclohexanone may cause damage to the liver and kidneys. Human experience has demonstrated severe dermatitis from prolonged/repeated skin exposure to n-methyl-2-pyrrolidone. Cyclohexanone and n-methyl-2-pyrrolidone have been reported to cause adverse reproductive effects in laboratory animals.

Carcinogen Status: None of the components are listed as a carcinogen by OSHA, IARC or NTP.

Medical Conditions Aggravated by Exposure: Pre-existing skin, liver and kidney diseases.

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SECTION 4: FIRST AID MEASURES

Eye: Rinse thoroughly with water for at least 15 minutes, holding the eye lids open to be sure the material is washed out. Get prompt medical attention.

Skin: Remove contaminated clothing. Wash contact area thoroughly with soap and water. Get medical attention if irritation or symptoms of exposure develop. Launder clothing before re-use.

Inhalation: Remove victim to fresh air. Give artificial respiration if needed. Get immediate medical attention.

Ingestion: If the victim is conscious and not convulsing, induce vomiting, keeping the head lower than the hips to prevent aspiration. Get immediate medical attention.

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SECTION 5: FIRE AND EXPLOSION DATA

Flash Point: 128^{o}F (53^{o}C) Flammable Limits: LEL: 1.1% UEL: 9.5%

Extinguishing Media: Use water fog or spray, alcohol-resistant foam, carbon dioxide or dry chemical.

Special Fire Fighting Procedures: Wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

Unusual Fire Hazards: Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back.

Hazardous Decomposition Products: Oxides of carbon, sulfur and nitrogen, hydrogen fluoride.

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SECTION 6: ACCIDENTAL RELEASE MEASURES

Spill: Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing including impervious gloves, safety goggles and respirator if needed. Ventilate area. Cover with and inert absorbent material and collect into an appropriate container for disposal. Report spills and releases as required to appropriate authorities.

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SECTION 7: HANDLING AND STORAGE

Handling: Avoid breathing vapors. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Wash thoroughly after handling. Do not eat, drink or smoke in the work area. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Keep containers closed when not in use.

Storage: Store in a cool, dry, well-ventilated location away from incompatible materials. Keep containers closed when not in use.

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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation: Use with adequate general or local exhaust ventilation to maintain exposure levels below the occupational exposure limits.

Respiratory Protection: If needed, a NIOSH/MSHA approved respirator with organic vapor cartridges may be used. For higher exposures (greater than 10 times the TLV), a supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

Skin Protection: Impervious gloves such as butyl rubber.

Eye Protection: Chemical safety goggles or face shield recommended.

Other Protective Equipment: Impervious clothing as needed to avoid skin contact and contamination of personal clothing. An eye wash facility should be available in the work area.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Dark, orange liquid with a sweet, sharp, fishy odor. The odor threshold for cyclohexanone is reported to be 0.12 ppm (mean value). No odor threshold data is available for n-methyl pyrrolidone.

pH: Not applicable

Specific Gravity: 1.002

Boiling Point: 156^{o}C (cyclohexanone)

Melting Point: Not determined

Vapor Pressure: 10 mmHg @ 39^{o}C

Water Solubility: Insoluble

Vapor Density: 3.4 (cyclohexanone)

Evaporation Rate: Not available

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SECTION 10: STABILITY AND REACTIVITY

Stability: Stable: X Unstable:

Incompatibility/Conditions to Avoid: Strong oxidizing agents, strong acids, strong alkalis, reducing agents. Keep away from heat, sparks, flames and other sources of ignition.

Hazardous Decomposition Products: Oxides of carbon , sulfur and nitrogen, hydrogen fluoride.

Hazardous Polymerization: May Occur: Will not occur: X

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SECTION 11: TOXICOLOGICAL INFORMATION

This product has not been tested as a whole. The following acute toxicity data is available for the components:

Cyclohexanone:	Oral rat LD50 - 1535 mg/kg Inhalation rat LC50 - 8000 ppm/4 hr
n-Methyl-2-pyrrolidone:	Oral rat LD50 - 3914 mg/kg Skin rabbit LD50 - 8 gm/kg

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SECTION 12: ECOLOGICAL INFORMATION

This product has not been tested as a whole. The following ecotoxicity data is available for the components:

Cyclohexanone: LC50 pimephales promelas (fathead minnow) 527 mg/l/96 hr flow-through bioassay.

n-Methyl-2-pyrrolidone: No data available.

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SECTION 13: DISPOSAL INFORMATION

Dispose in accordance with all local, state and federal regulations.

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SECTION 14: TRANSPORT INFORMATION

DOT Shipping Name: Resin Solution, Flammable ERG #127
DOT Hazard Class: 3, PG III
UN Number: UN1866
DOT Labels Required (49CFR172.101): Flammable Liquid (See 173.120 for domestic shipment exemption for combustible liquids)
Hazardous Substance (49CFR172.101): Cyclohexanone (RQ 5000 lbs)
Reportable Quantity: Product - 7690 lbs

IATA Shipping Name: Resin Solution, Flammable
IATA Hazard Class: 3, PG III
UN Number: UN1866
IATA Hazard Labels Required: Flammable Liquid

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SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

CERCLA 103 Reportable Quantity: 7690 lbs. (cyclohexanone - 5000 lbs)

SARA TITLE III:

Hazard Category for Section 311/312: Acute Health, Chronic Health, Fire Hazard

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirement: n-methyl-2-pyrrolidone CAS#872-50-4 35-50%.

Section 302 Extremely Hazardous Substances (TPQ): None.

EPA Toxic Substances Control Act (TSCA) Status: This product contains a substance(s) that is not listed on the EPA TSCA inventory. A low volume exemption notice has been filed. This exemption restricts the use of this product to Microelectronic Manufacturing Applications.

STATE REGULATIONS:

California Proposition 65: These products contain the following substances known to the State of California to cause cancer and/or reproductive harm: None

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SECTION 16: OTHER INFORMATION

HMIS Ratings:	Health - 2*	Flammability - 2	Reactivity - 0
NFPA Ratings:	Health - 2	Flammability - 2	Reactivity - 0

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This above information is believed to be correct but does not propose to be all inclusive and shall be used only as a guide. Brewer Science shall not be held liable for any damage resulting from handling or from contact with the above product.