BREWER SCIENCE INC.  
SAFETY DATA SHEET

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

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

1.1 Product Identifier:  
Trade Name:  
ARC i-CON® Series  
This SDS covers the following products:  
ARC i-CON®-7  
ARC i-CON®-16  
ARC i-CON®-316

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against:  
Product Use:  
Anti-Reflective Coating  
Uses Advised Against:  
None

1.3 Details of the Supplier of the Safety Data Sheet:  
Manufacturer:  
Brewer Science, Inc.  
2401 Brewer Drive  
Rolla, MO 65401

Information Phone Number:  
(573) 364-0300  
Fax Number:  
(573) 368-3318  
E-mail:  
msds@brewerscience.com

1.4 Emergency Telephone Number:  
Emergency Spill Information:  
Chemtrec Domestic North America: (800) 424-9300  
Chemtrec International: (703) 527-3887  
Chemtrec Taiwan: 00801-14-8954

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture:  

GHS Classification:  
Eye Damage Category 1 (H318)  
Flammable Liquid Category 3 (H226)  
Specific Target Organ Toxicity Single Exposure Category 3 (H335)

EU Classification:  
Flammable, Irritant (Xi) R10, R37, R41

2.2 Label Elements:  
Danger!

Contains: Ethyl Lactate

Hazard Phrases  
H226 Flammable liquid and vapor.  
H318 Causes serious eye damage.  
H335 May cause respiratory irritation.

Precautionary Phrases  
P210 Keep away from heat, sparks, open flames, and hot surfaces. – No smoking.

Prepared By: Safety & Environmental Units  
Approved By: Safety & Environmental Units  
Issue/Revision Date F.7.6.1074.J / 7/9/14  
Date of latest review 7/9/14
Prepare By: Safety & Environmental Units
Approved By: Safety & Environmental Units
Issue/Revision Date: F.7.6.1074.J / 7/9/14
Date of latest review: 7/9/14

2.3 Other Hazards: None known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixture:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS#</th>
<th>EINECS#</th>
<th>ENCS/ISHL</th>
<th>EU Classification (67/548/EEC)</th>
<th>CLP Annex VI Classification</th>
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<tbody>
<tr>
<td>Ethyl lactate</td>
<td>97-64-3</td>
<td>202-598-0</td>
<td>(2)1371/</td>
<td>Xi R10, R37, R41</td>
<td>Flam. Liq. Cat 3 (H226), STOT SE Cat 3 (H335), Eye Dam. Cat 1 (H318)</td>
<td>65-80</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(2)1371</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Propylene glycol monomethyl ether</td>
<td></td>
<td></td>
<td>(2)-3144</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>acetate, PGMEA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polymer Solids</td>
<td>Proprietary</td>
<td>Proprietary</td>
<td>No EU Classification or R</td>
<td>No GHS Classification</td>
<td>&lt;1-10</td>
<td></td>
</tr>
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<td>Proprietary</td>
<td>No EU Classification or R</td>
<td>No GHS Classification</td>
<td>&lt;2</td>
<td></td>
</tr>
</tbody>
</table>

See Section 16 for further information on EU and GHS Classification.

SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures:

**Eye:** Immediately flush thoroughly with water for at least 20 minutes, while holding the eye lids open to be sure the material is washed out. Get immediate 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. If breathing is difficult, oxygen should be administered by qualified personnel. Get medical attention if symptoms of exposure persist.

**Ingestion:** Do not induce vomiting unless directed to do so by medical personnel. Keep the victim calm and warm. Get medical attention if you feel unwell.

### 4.2 Most Important symptoms and effects, both acute and delayed:
May cause severe eye irritation and burns with possible eye damage. May cause skin and respiratory irritation. Inhalation of mists may cause headache, dizziness, nausea and other symptoms of central nervous system depression.

### 4.3 Indication of any immediate medical attention and special treatment needed:
Immediate medical attention is required for eye contact.

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**SECTION 5: FIRE-FIGHTING MEASURES**

### 5.1 Extinguishing Media:
Use water fog or spray, universal foam, carbon dioxide or dry chemical.

### 5.2 Special Hazards Arising from the Substance or Mixture:

**Unusual Fire and Explosion Hazards:** Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Vapors may form explosive mixtures with air in confined areas. As with any ether, 2-(1-Methoxy)propyl acetate may form highly reactive peroxides upon contact with air.

**Combustion Products:** Oxides of carbon, nitrogen, and sulfur, formaldehyde, and unknown materials.

### 5.3 Advice for Fire-Fighters:
Wear an approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

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**SECTION 6: ACCIDENTAL RELEASE MEASURES**

### 6.1 Personal Precautions, Protective Equipment and Emergency Procedures:
Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed. Ventilate area.

### 6.2 Environmental Precautions:
Report spills and releases as required to appropriate authorities.

### 6.3 Methods and Material for Containment and Cleaning Up:
Cover with an inert absorbent material and collect into an appropriate container for disposal.

### 6.4 Reference to Other Sections:
Refer to Section 8 for Personal Protective Equipment and Section 13 for Disposal information.

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**SECTION 7: HANDLING AND STORAGE**

### 7.1 Precautions for Safe Handling:
Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Always wear impervious gloves, chemical safety goggles and protective clothing when handling this material. 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.

### 7.2 Conditions for Safe Storage, Including any Incompatibilities:
Store in a cool, dry, well-ventilated location away from oxidizers and other incompatible materials. Keep containers closed when not in use.

### 7.3 Specific end use(s):
Industrial use only

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**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

### 8.1 Control Parameters:

<table>
<thead>
<tr>
<th>Prepared By:</th>
<th>Safety &amp; Environmental Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved By:</td>
<td>Safety &amp; Environmental Units</td>
</tr>
<tr>
<td>Issue/Revision Date</td>
<td>F.7.6.1074.J / 7/9/14</td>
</tr>
<tr>
<td>Date of latest review</td>
<td>7/9/14</td>
</tr>
</tbody>
</table>
### 8.2 Exposure Controls:

**Ventilation:** Use with adequate general or local exhaust ventilation to maintain exposure levels below the occupational exposure limits. Use explosion proof electrical equipment and wiring where required.

**Personal Protective Equipment:**
- **Respiratory Protection:** If needed, an approved respirator with organic vapor cartridges may be used. For higher exposures, supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow applicable regulations and good Industrial Hygiene practice.
- **Skin Protection:** Impervious gloves such as 4H or Silver Shield gloves are suggested to prevent prolonged skin contact. Contact your glove supplier for selection assistance.
- **Eye Protection:** Chemical safety goggles are recommended.
- **Other Protective Equipment:** Impervious clothing is required to prevent skin contact and contamination of personal clothing. An eye wash facility and safety shower should be available in the work area.

### 9.1 Information on basic Physical and Chemical Properties:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl lactate</td>
<td>None Established</td>
</tr>
<tr>
<td>2-(1-Methoxy)propyl acetate</td>
<td>50 ppm TWA AIHA WEEL</td>
</tr>
<tr>
<td></td>
<td>50 ppm TWA DFG MAK</td>
</tr>
<tr>
<td></td>
<td>50 ppm UK-TWA, 100 ppm UK-STE L skin</td>
</tr>
<tr>
<td></td>
<td>50 ppm EU-TWA, 100 ppm EU STEL skin</td>
</tr>
<tr>
<td>Polymer Solids</td>
<td>None Established</td>
</tr>
<tr>
<td>Crosslinker</td>
<td>None Established</td>
</tr>
</tbody>
</table>

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

- **Appearance:** Clear liquid
- **Odor:** Slight, sweet odor
- **Odor Threshold:** No data available
- **pH:** No data available
- **Melting Point/Freezing Point:** No data available.
- **Initial Boiling Point/Range:** 154°C (309.2°F) (Ethyl lactate)
- **Flash Point:** 46°C (114°F) (PGMEA)
- **Evaporation Rate:** No data available
- **Flammable Limits:** LEL: 1.5 vol % (PGMEA) UEL: 11.4 vol % (Ethyl Lactate)
- **Vapor Pressure:** 3.7 mm Hg @ 20°C (PGMEA)
- **Molecular Formula:** Mixture
- **Molecular Weight:** Mixture
- **Vapor Density:** 4.6 (PGMEA)
- **Specific Gravity:** No data available
- **Solubility:** Partially soluble in water
- **Octanol/Water Partition Coefficient:** No data available
- **Autoignition Temperature:** No data available
- **Decomposition Temperature:** No data available
- **Viscosity:** No data available
- **Explosive Properties:** Not explosive
- **Oxidizing Properties:** Not an oxidizer
- **Relative Density:** No data available
- **Flammability (solid, gas):** Not applicable

### 9.2 Other Information:

- None available

### 10.1 Reactivity:

- Not reactive

### 10.2 Chemical Stability:

- Stable under normal storage and handling conditions.

### 10.3 Possibility of Hazardous Reactions:

- Will not occur.

### 10.4 Conditions to Avoid:

- Keep away from heat, sparks, flames and other sources of ignition.

### 10.5 Incompatible Materials:

- Strong oxidizing agents, inorganic acids, and bases.

### 10.6 Hazardous Decomposition Products:

- Combustion will produce oxides of carbon, sulfur, and nitrogen, formaldehyde and unknown materials.
SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects:

Potential Health Effects:

Eye: May cause severe eye irritation. Corneal injury is possible.
Skin: May cause irritation with prolonged or repeated exposure. 2-(1-Methoxy)propyl acetate may be absorbed through
the skin causing symptoms of headache, dizziness, nausea, and drowsiness.
Inhalation: Inhalation of vapors, mists, or aerosols may cause nose and throat irritation with the possibility of central
nervous system depression. Symptoms of central nervous system depression include headache, dizziness, drowsiness,
nausea and unconsciousness.
Ingestion: Swallowing may cause gastrointestinal irritation and central nervous system depression with symptoms similar
to those described under inhalation.
Chronic Hazards: Chronic absorption may cause kidney or liver damage based on studies with laboratory animals.

Acute Toxicity Values:
Ethyl Lactate: Ethyl Lactate: Oral rat LD50 - 8200 mg/kg; Skin rabbit LD50 - >5000 mg/kg
2-(1-Methoxy)propyl acetate: Oral rat LD50 - 8532 mg/kg; Skin rabbit LD50 - >5000 mg/kg
Polymer Solids: No toxicity data is available
Crosslinker: Oral rat LD50 - >2000 mg/kg; Skin rabbit LD50 - >2000 mg/kg; Inhalation rat LC50 >5 mg/L/ 4hr

Skin corrosion/irritation: 2-(1-Methoxy)propyl acetate: Non-irritating to rabbit skin. Ethyl Lactate: Not corrosive to skin,
irritating to guinea pig by intradermal injection.

Eye damage/irritation: 2-(1-Methoxy)propyl acetate: Slightly irritating to rabbit eyes. Ethyl Lactate: Possibly corrosive to eyes,
irritating to rabbit eyes.

Respiratory Irritation: No data available.

Respiratory Sensitization: No data available.

Skin Sensitization: 2-(1-Methoxy)propyl acetate: Non-sensitizing in guinea pig maximization test.

Germ Cell Mutagenicity: 2-(1-Methoxy)propyl acetate: Negative in Ames test and unscheduled DNA synthesis.

Carcinogenicity: None of the components of this product are listed as carcinogens by OSHA, IARC, NTP, ACGIH and the EU
CLP.

Reproductive Toxicity: 2-(1-Methoxy)propyl acetate: In rats, no teratological or other developmental effects were observed at
doses to 4000 ppm by inhalation. Ethyl Lactate: No evidence of tertagenicity or maternal toxicity was observed in a dermal study.

Specific Target Organ Toxicity:
Single Exposure: No data available

Repeat Exposure: 2-(1-Methoxy)propyl acetate: In a two week inhalation study in rats and mice, doses from 300 –
3000 ppm cause some degeneration of tissues of the nasal cavity. No other adverse effects were seen. Ethyl Lactate:
Inhalation studies have shown nasal degeneration but no systemic effects – NOAEL 200 mg/m³.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity:
2-(1-Methoxy)propyl acetate: 96 hr LC50 Fathead minnow- 161 mg/L (Static); 48 hr LC50 daphnia magna- >500 mg/L
Crosslinker: 96 hr LC50 Bluegill Sunfish– >603.1 mg/L; 48 hr EC50 Daphnia Magna - >100 mg/L

12.2 Persistence and Degradability: 2-(1-Methoxy)propyl acetate: Readily biodegradable – 100% in 6 days. Ethyl Lactate:
Readily biodegradable. Crosslinker: This material is not readily biodegradable.

12.3 Bioaccumulative Potential: No data available

12.4 Mobility in Soil: No data available
12.5 Results of PBT and vPvB Assessment: No data available

12.6 Other Adverse Effects: Not applicable

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods:
Dispose in accordance with all local, state and federal regulations.

SECTION 14: TRANSPORTATION INFORMATION

<table>
<thead>
<tr>
<th>14.1 UN Number</th>
<th>14.2 UN Proper Shipping Name</th>
<th>14.3 Hazard Class(s)</th>
<th>14.4 Packing Group</th>
<th>14.5 Environmental Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>US DOT</td>
<td>UN1866 Resin Solution, Flammable</td>
<td>3</td>
<td>PG III</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Canadian TDG</td>
<td>UN1866 Resin Solution, Flammable</td>
<td>3</td>
<td>PG III</td>
<td>Not applicable</td>
</tr>
<tr>
<td>IMDG</td>
<td>UN1866 Resin Solution, Flammable</td>
<td>3</td>
<td>PG III</td>
<td>Not applicable</td>
</tr>
<tr>
<td>IATA/ICAO</td>
<td>UN1866 Resin Solution, Flammable</td>
<td>3</td>
<td>PG III</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

14.6 Special Precautions for User: Not applicable

14.7 Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

SECTION 15: REGULATORY INFORMATION

15.1 Safety, Health and Environment Regulations/Legislation Specific for the Substance or Mixture:

U.S. FEDERAL REGULATIONS:

CERCLA 103 Reportable Quantity: This product is not subject to reporting under CERCLA. Some states have more stringent reporting requirements. Report all spills in accordance with local, state, and federal regulations.

SARA TITLE III:

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

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements: None

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 has been granted. This exemption restricts the use of this product to Microelectronic Manufacturing Applications.

STATE REGULATIONS:

California Proposition 65: This product contains substances known to the State of California to cause cancer and/or developmental harm.

INTERNATIONAL REGULATIONS:

EUROPEAN REGULATIONS

Prepared By: Safety & Environmental Units
Approved By: Safety & Environmental Units
Issue/Revision Date 7.6.1074.J / 7/9/14
Date of latest review 7/9/14
REACH: Brewer products comply with REACH regulation as applicable. For more information, contact the Brewer REACH coordinator.

SVHC: This product contains the following Substances of Very High Concern (SVHCs): None.

JAPANESE REGULATIONS

Industrial Safety and Health Law:

<table>
<thead>
<tr>
<th>Manufacture Prohibited</th>
<th>Manufacture Allowed</th>
<th>Notification Obligation</th>
<th>Labeling Obligation</th>
<th>MSDS Obligation</th>
<th>Dangerous Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Flammable Substance-Group 4</td>
</tr>
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</table>

Poisonous and Deleterious Substances Control Law (PDSCL): None of the chemicals are listed.

Pollutant Release and Transfer Register (PRTP): None of the chemicals are listed.

Law Concerning the Protection of the Ozone Layer: None of the chemicals are listed.

Fire Service Law: Group 4 - Flammable liquids (2nd Class petroleum)

Ship Safety Act: Flammable liquid (Hazard Regulation Article 3, hazardous substance notice appendix 1)

Aviation Law: Flammable liquid (regulation Article 194, hazardous substance notice appendix 1)

Air Pollution Control Law: None of the chemicals are listed.

Water Pollution Control Act: None of the chemicals are listed.

Soil Contamination Countermeasures Law: None of the chemicals are listed.

Offensive Odor Control Law: None of the chemicals are listed.

Act on Prevention of Marine Pollution and Maritime Disaster: None of the chemicals are listed.

15.2 Chemical Safety Assessment: None Required

SECTION 16: OTHER INFORMATION

HMIS Ratings: Health - 3 Flammability - 2 Physical Hazard - 0
NFPA Ratings: Health - 3 Flammability - 2 Instability - 0

SDS Revision History:
4/6/01: New MSDS
10/8/01: Skin protection updated
7/30/07: Updated format, updated name and Section 3 components.
6/17/08: Changed product name. Updated formulation. Edited spelling, format, and wording.
11/24/08: Added ACGIH to Carcinogen Status. Edited formatting for Acute Toxicity Values.
3/1/12: Added CLP Classifications to Section 3. Updated format and data.
8/22/12: Section 1: Name, Section 2: Composition, Section 11: Updated hazard information, Section 12: Updated Ecotoxicity data, Section 15: added Methanol.
5/20/13: Updated format. Updated formulation.
7/9/14: Updated Section 1: Removed date of preparation, footer, Section 4: First aid, and Section 6.4: added reference.

GHS Classification for Reference (See Sections 2 and 3):
Eye Dam. Cat 1 Eye Damage Category 1
Flam. Liq. Cat 3 Flammable Liquid Category 3
STOT SE Cat 3 Specific Target Organ Toxicity Single Exposure Category 3
H226 Flammable liquid and vapor.

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7 / 8
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

**EU Classes and Risk Phrases for Reference (See Sections 2 and 3):**
Xi Irritant
R10 Flammable
R37 Irritating to respiratory system.
R41 Risk of serious damage to eyes.

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, Inc. shall not be held liable for any damage resulting from handling or from contact with the above product.