1 Identification of the substance/mixture and of the company

- Product identifier
- Trade name: LOR B Series Resists
- Product number: G316702, G316703, G316704, G316707, G316708, G316709, G316710, G316711, G316712, G316715, G316716, G316719
- Application of the substance / the preparation Photoresist
- Details of the supplier of the safety data sheet
  Manufacturer/Supplier: MicroChem Corp.
  90 Oak Street
  P.O. Box 426
  Newton, MA 02464-0002 USA
- Information department:
  Product Safety
  Email: productssafety@microchem.com
- Emergency telephone number:
  MicroChem Corp: 617-965-5511
  Chemtrec USA Emergency: 800-424-9300
  Chemtrec International Emergency: 703-527-3887

2 Hazards identification

- Classification of the substance or mixture
  \( \text{GHS02 Flame} \)
  Flam. Liq. 3 H226 Flammable liquid and vapor.
  \( \text{GHS08 Health hazard} \)
  STOT RE 2 H373 May cause damage to the central nervous system, the kidneys and the liver through prolonged or repeated exposure. Route of exposure: Oral, Inhalative and Dermal.
  \( \text{GHS07} \)
  Acute Tox. 4 H302 Harmful if swallowed.
  Skin Irrit. 2 H315 Causes skin irritation.
  Eye Irrit. 2A H319 Causes serious eye irritation.
  STOT SE 3 H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

- Label elements
  - GHS label elements The product is classified and labelled according to the Globally Harmonized System (GHS).
  - Hazard pictograms
    - GHS02
    - GHS07
    - GHS08

(Contd. on page 2)
 Trade name: LOR B Series Resists

- **Signal word** Warning

- **Hazard-determining components of labelling:**
  - Proprietary Dye B
  - 1-methoxy-2-propanol
  - Cyclopentanone

- **Hazard statements**
  - H226 Flammable liquid and vapor.
  - H302 Harmful if swallowed.
  - H315 Causes skin irritation.
  - H319 Causes serious eye irritation.
  - H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.
  - H373 May cause damage to the central nervous system, the kidneys and the liver through prolonged or repeated exposure. Route of exposure: Oral, Inhalative and Dermal.

- **Precautionary statements**
  - P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
  - P260 Do not breathe dust/fume/gas/mist/vapours/spray.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P233 Keep container tightly closed.
  - P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - P312 Call a POISON CENTER or doctor/physician if you feel unwell.
  - P337+P313 If eye irritation persists: Get medical advice/attention.
  - P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
  - P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
  - P370+P378 In case of fire: Use for extinction: Carbon dioxide.
  - P403+P235 Store in a well-ventilated place. Keep cool.
  - P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Classification system:**
  - NFPA ratings (scale 0 - 4)
    - Health = 2
    - Fire = 3
    - Reactivity = 0
  - HMIS-ratings (scale 0 - 4)
    - Health = 2
    - Fire = 3
    - Reactivity = 0

- **Other hazards**
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Mixtures
- Description: Mixture of the substances listed below with nonhazardous additions.
Safety Data Sheet
acc. to ISO/DIS 11014

Trade name: LOR B Series Resists

<table>
<thead>
<tr>
<th>Dangerous components:</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-92-3 Cyclopentanone</td>
</tr>
<tr>
<td>☑ Flam. Liq. 3, H226; ☑ Acute Tox. 4, H312; Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335-H336</td>
</tr>
<tr>
<td>65-90%</td>
</tr>
<tr>
<td>107-98-2 1-methoxy-2-propanol</td>
</tr>
<tr>
<td>☑ Flam. Liq. 3, H226; ☑ STOT RE 2, H373; ☑ STOT SE 3, H335</td>
</tr>
<tr>
<td>10-15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Components:</th>
</tr>
</thead>
<tbody>
<tr>
<td>102322-80-5 Polyvalphatic imide copolymer</td>
</tr>
<tr>
<td>☑ Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335</td>
</tr>
<tr>
<td>1-20%</td>
</tr>
<tr>
<td>Proprietary Dye B</td>
</tr>
<tr>
<td>☑ Acute Tox. 4, H302; Skin Irrit. 2, H315; Eye Irrit. 2A, H319</td>
</tr>
<tr>
<td>0.1-2%</td>
</tr>
</tbody>
</table>

4 First aid measures

- Description of first aid measures
- General information: Immediately remove any clothing soiled by the product.
- After inhalation:
  Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
- After skin contact: Immediately wash with water and soap and rinse thoroughly.
- After eye contact: Rinse opened eye for several minutes under running water and then consult a doctor.
- After swallowing:
  Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.
- Information for doctor:
  - Most important symptoms and effects, both acute and delayed: No further relevant information available.
  - Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Firefighting measures

- Extinguishing media
- Suitable extinguishing agents:
  - Alcohol resistant foam
  - Fire-extinguishing powder
  - Carbon dioxide
- For safety reasons unsuitable extinguishing agents:
  - Water with full jet
  - Water
- Special hazards arising from the substance or mixture:
  - Containers may explode due to pressure increase when container is exposed to extreme heat. Vapors may travel a considerable distance to a source of ignition and flash back along vapor trail.
- Advice for firefighters
- Protective equipment: Wear SCBA.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures:
  - Wear protective equipment. Keep unprotected persons away.
  - Ensure adequate ventilation.

(Contd. on page 4) USA
7 Handling and storage

· Handling:
  · Precautions for safe handling
    Ensure good ventilation/exhaust at the workplace.
    Prevent formation of aerosols.
    Keep receptacles tightly sealed.
    Store in cool, dry place in tightly closed containers.
    Keep away from heat and direct sunlight.
    Use only under yellow light
  · Information about protection against explosions and fires:
    Keep ignition sources away - Do not smoke.
    Use explosion-proof apparatus / fittings and spark-proof tools.
    Protect against electrostatic charges.
· Conditions for safe storage, including any incompatibilities
· Storage:
  · Requirements to be met by storerooms and containers:
    Store in a cool location.
    Due to photo-sensitivity, store product in brown-glass or stainless steel receptacles.
  · Information about storage in one common storage facility:
    Do not store together with oxidizing and acidic materials.
  · Further information about storage conditions:
    Keep container well-sealed in cool, dry location.
    Store receptacle in a well ventilated area.
    Avoid contact with air / oxygen (formation of peroxide).
    Store under lock and key and with access restricted to technical experts or their assistants only.
· Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.
· Control parameters
  · Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>107-98-2 1-methoxy-2-propanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>REL Short-term value: 540 mg/m³, 150 ppm</td>
</tr>
<tr>
<td>Long-term value: 360 mg/m³, 100 ppm</td>
</tr>
<tr>
<td>TLV Short-term value: 553 mg/m³, 150 ppm</td>
</tr>
<tr>
<td>Long-term value: 369 mg/m³, 100 ppm</td>
</tr>
</tbody>
</table>

(Contd. on page 5)
**9 Physical and chemical properties**

- **Information on basic physical and chemical properties**
  - **General Information**
  - **Appearance:**
    - Form: Liquid
    - Color: Yellow-brown
    - Odor: Sweet
    - Odour threshold: Not determined.
  - **pH-value:** Not determined.
  - **Change in condition**
    - Melting point/Melting range: Undetermined
    - Boiling point/Boiling range: 120 °C (248 °F)
  - **Flash point:** 30 °C (86 °F)
  - **Flammability (solid, gaseous):** Not applicable.
  - **Ignition temperature:** 270 °C (518 °F)
  - **Decomposition temperature:** Not determined.
  - **Auto igniting:** Product is not self-igniting.
  - **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
  - **Explosion limits:**
    - Lower: 2.3 Vol %

(Contd. on page 6)
Safety Data Sheet
acc. to ISO/DIS 11014

Trade name: LOR B Series Resists

Upper:

- Vapor pressure at 20 °C (68 °F): 12 hPa (9 mm Hg)
- Density: Not determined.
- Relative density: See Table 1 Other Information
- Vapour density: Not determined.
- Evaporation rate: Not determined.
- Solubility in / Miscibility with Water: Water miscible No
- Partition coefficient (n-octanol/water): Not determined.

Viscosity:
- Dynamic: Not determined.
- Kinematic: Not determined.

Other information: Table 1. Product specific gravity and VOC data.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number</th>
<th>Sp. Grav.</th>
<th>Vol. (% by wt.)</th>
<th>VOC (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOR 0.7B</td>
<td>G316702</td>
<td>0.965</td>
<td>98</td>
<td>40</td>
</tr>
<tr>
<td>LOR 1B</td>
<td>G316703</td>
<td>0.967</td>
<td>96</td>
<td>930</td>
</tr>
<tr>
<td>LOR 2B</td>
<td>G316704</td>
<td>0.973</td>
<td>95</td>
<td>930</td>
</tr>
<tr>
<td>LOR 3B</td>
<td>G316707</td>
<td>0.980</td>
<td>93</td>
<td>920</td>
</tr>
<tr>
<td>LOR 5B</td>
<td>G316708</td>
<td>0.982</td>
<td>92</td>
<td>910</td>
</tr>
<tr>
<td>LOR 6B</td>
<td>G316709</td>
<td>0.984</td>
<td>91</td>
<td>900</td>
</tr>
<tr>
<td>LOR 7B</td>
<td>G316710</td>
<td>0.988</td>
<td>91</td>
<td>900</td>
</tr>
<tr>
<td>LOR 10B</td>
<td>G316711</td>
<td>0.990</td>
<td>89</td>
<td>880</td>
</tr>
<tr>
<td>LOR 15B</td>
<td>G316712</td>
<td>0.992</td>
<td>88</td>
<td>870</td>
</tr>
<tr>
<td>LOR 20B</td>
<td>G316715</td>
<td>1.002</td>
<td>86</td>
<td>860</td>
</tr>
<tr>
<td>LOR 30B</td>
<td>G316716</td>
<td>1.004</td>
<td>85</td>
<td>850</td>
</tr>
<tr>
<td>LOR 50B</td>
<td>G316719</td>
<td>1.007</td>
<td>82</td>
<td>830</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

- Reactivity
- Chemical stability: Stable under normal use conditions
- Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
- Possibility of hazardous reactions: No dangerous reactions known.
- Conditions to avoid: Heat, flames and sparks. Extremes of temperature and direct sunlight.
- Incompatible materials:
- Strong Oxidizing Agents, Strong Bases, Strong Acids, Strong Reducing Agents, Iron, Hydrazine
- Hazardous decomposition products:
- Carbon monoxide and carbon dioxide
- Nitrogen oxides (NOx)

11 Toxicological information

- Information on toxicological effects
- Acute toxicity:
- LD/LC50 values that are relevant for classification:

| 120-92-3 Cyclopentanone
| Oral | LD50 | 1180 mg/kg (rat) |

(Contd. on page 7)
Trade name: LOR B Series Resists

Dermal  
LD50 >2000 mg/kg (rabbit)

Inhalative  
LC50/4 h >19.5 mg/l (rat)

107-98-2 1-methoxy-2-propanol

Oral  
LD50 5660 mg/kg (rat)

Dermal  
LD50 13000 mg/kg (rabbit)

Inhalative  
LC50/4 h 54.6 mg/l (rat)

102322-80-5 Polyaliphatic imide copolymer

Oral  
LD50 >5000 mg/kg (rat) (Data for compositionally similar material)

Dermal  
LD50 >5000 mg/kg (rat) (Data for compositionally similar material)

- **Primary irritant effect:**
  - **on the skin:** Irritant to skin and mucous membranes.
  - **on the eye:** Irritating effect.
  - **Sensitization:** No sensitizing effects known.
  - **Experience with humans:** No further relevant information available.

- **Additional toxicological information:**
  The product shows the following dangers according to internally approved calculation methods for preparations: Irritant

- **Carcinogenic categories**
  - **IARC (International Agency for Research on Cancer)**
    None of the ingredients are listed.
  - **NTP (National Toxicology Program)**
    None of the ingredients are listed.

---

**12 Ecological information**

- **Toxicity**
  - **Aquatic toxicity:**

<table>
<thead>
<tr>
<th>120-92-3 Cyclopentanone</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50/48 h 100 mg/l (daphnia magna)</td>
<td></td>
</tr>
<tr>
<td>EC50/72 h &gt;100 mg/l (scenedesmus subspicatus)</td>
<td></td>
</tr>
<tr>
<td>LC50/96 h &gt;100 mg/l (fish)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>107-98-2 1-methoxy-2-propanol</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50/96 hr 23300 mg/l (daphnia magna)</td>
<td></td>
</tr>
<tr>
<td>&gt;1000 mg/l (green algae)</td>
<td></td>
</tr>
<tr>
<td>LC50/96 h 20800 mg/l (Pimephales promelas)</td>
<td></td>
</tr>
</tbody>
</table>

- **Persistence and degradability**
  No further relevant information available.

- **Behavior in environmental systems:**
  No further relevant information available.

- **Mobility in soil**
  No further relevant information available.

- **Additional ecological information:**
  - **General notes:**
    Water hazard class 1 (Self-assessment): slightly hazardous for water
    Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

- **Results of PBT and vPvB assessment**
  - **PBT:** Not applicable.
  - **vPvB:** Not applicable.

(Contd. on page 8)
13 Disposal considerations

- Waste treatment methods
  Recommendation:
  Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system. Disposal must be made in accordance with Federal, State, and Local regulations.

- Uncleaned packagings:
  Recommendation: Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

- UN-Number
  DOT, ADR, IMDG, IATA
  UN1866

- UN proper shipping name
  DOT, IMDG, IATA
  RESIN SOLUTION
  ADR
  1866 RESIN SOLUTION

- Transport hazard class(es)

  - DOT

  - Class
    3 Flammable liquids.

  - Label
    3

  - ADR, IMDG, IATA

  - Class
    3 Flammable liquids

  - Label
    3

- Packing group
  DOT, ADR, IMDG, IATA
  III

- Environmental hazards:
  Marine pollutant:
  No

- Special precautions for user
  Warning: Flammable liquids
  33

- Danger code (Kepler):
  33

- EMS Number:
  F-E-S-E

- Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
  Not applicable.

- UN "Model Regulation":
  UN1866, RESIN SOLUTION, 3, III

(Contd. on page 9)
15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
  
  - Section 355 (extremely hazardous substances):
    None of the ingredients are listed.
  
  - Section 313 (Specific toxic chemical listings):
    None of the ingredients is listed.
  
  - TSCA (Toxic Substances Control Act):
    All ingredients are listed or comply with TSCA regulations.
  
  - Proposition 65
    
    - Chemicals known to cause cancer:
      None of the ingredients are listed.
    
    - Chemicals known to cause reproductive toxicity for females:
      None of the ingredients are listed.
    
    - Chemicals known to cause reproductive toxicity for males:
      None of the ingredients are listed.
    
    - Chemicals known to cause developmental toxicity:
      None of the ingredients are listed.

- Carcinogenic categories

- EPA (Environmental Protection Agency)
  None of the ingredients are listed.

- TLV (Threshold Limit Value established by ACGIH)
  None of the ingredients are listed.

- NIOSH-Ca (National Institute for Occupational Safety and Health)
  None of the ingredients are listed.

- OSHA-Ca (Occupational Safety & Health Administration)
  None of the ingredients are listed.

- Massachusetts State Right To Know List
  120-92-3 Cyclopentanone
  107-98-2 1-methoxy-2-propanol

- New Jersey State Right To Know List
  120-92-3 Cyclopentanone
  107-98-2 1-methoxy-2-propanol

- Pennsylvania Hazardous Substances List
  120-92-3 Cyclopentanone
  107-98-2 1-methoxy-2-propanol

- California SCAQMD Rule 443.1 VOC's: See Table 1 - Section 9
- GHS label elements The product is classified and labelled according to the Globally Harmonized System (GHS).
Hazard pictograms

GHS02  GHS07  GHS08

Signal word Warning

Hazard-determining components of labelling:
Proprietary Dye B
1-methoxy-2-propanol
Cyclopentanone

Hazard statements
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P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
P370+P378 In case of fire: Use for extinction: Carbon dioxide.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department issuing MSDS: Product safety department
Contact: Mr. Weber

Last Revision Date:
8/21/2013 Revised hazard classification and precautionary statements. Updated component toxicology data.

Abbreviations and acronyms:
RID: Règlement International concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organization
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association

(Contd. on page 11)
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Association (USA)</td>
</tr>
<tr>
<td>HMIS</td>
<td>Hazardous Materials Identification System (USA)</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal concentration, 50 percent</td>
</tr>
<tr>
<td>LD50</td>
<td>Lethal dose, 50 percent</td>
</tr>
</tbody>
</table>