1 Identification of the substance/mixture and of the company

- Product identifier
  - Trade name: LOR A Series Resists
- Product number:
  G516602, G516603, G516604, G516605, G516606, G516607, G516608, G516658, G516609, G516610, G516611, G516612, G516614, G516616, G516619
- Application of the substance / the preparation Photoresist

2 Composition/information on ingredients

- Chemical characterization: Mixtures
- Description: Mixture of the substances listed below with nonhazardous additions.

<table>
<thead>
<tr>
<th>Chemical Component</th>
<th>Description</th>
<th>Hazard Symbols</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-92-3 cyclopentanone</td>
<td></td>
<td>H226, H315, H319</td>
<td>65-90%</td>
</tr>
<tr>
<td>107-98-2 1-methoxy-2-propanol</td>
<td></td>
<td>H226, H336</td>
<td>5-25%</td>
</tr>
<tr>
<td>proprietary dye</td>
<td></td>
<td>H412</td>
<td>0.1-2%</td>
</tr>
</tbody>
</table>

- Additional Components:
  102322-80-5 Polyaliphatic imide copolymer | H303, H313 | 1-20% |

3 Hazards identification

- Classification of the substance or mixture
  - GHS02 Flame
    - H226 Flammable liquid and vapor.
  - GHS07
    - H315 Causes skin irritation.
    - H319 Causes serious eye irritation.

- Label elements
  - GHS label elements The product is classified and labelled according to the Globally Harmonized System (GHS). (Contd. on page 2)
34.1.12

· Hazard pictograms

GHS02 GHS07

· Signal word Warning

· Hazard statements

H226 Flammable liquid and vapor.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

· Precautionary statements

P101 If medical advice is needed, have product container or label at hand.
P102 Keep out of reach of children.
P103 Read label before use.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P241 Use explosion-proof electrical/ventilating/lighting/equipment.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
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

4 First aid measures

· After inhalation: Supply fresh air or oxygen; call for doctor.

· After skin contact:

Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.

· After eye contact: Rinse opened eye for several minutes under running water and then consult a doctor.

· After swallowing: Seek medical treatment.

5 Firefighting measures

· Suitable extinguishing agents: CO2, sand, extinguishing powder. Do not use water.

· For safety reasons unsuitable extinguishing agents: Water with full jet

· Special hazards arising from the substance or mixture No further relevant information available.
6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
- Environmental precautions:
  Do not allow to enter sewers/surface or ground water.
  No release to water in manufacturing, processing, use, or disposal.
- Methods and material for containment and cleaning up:
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  Ensure adequate ventilation.
  Do not flush with water or aqueous cleansing agents

- Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

- Handling:
  - Precautions for safe handling
    Ensure good ventilation/exhaust at the workplace.
    Prevent formation of aerosols.
  - Information about protection against explosions and fires:
    Keep ignition sources away - Do not smoke.
    Protect against electrostatic charges.
- Storage:
  - Requirements to be met by storerooms and containers: No special requirements.
  - Information about storage in one common storage facility: Not required.
  - Further information about storage conditions: Keep container tightly sealed.
  - 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.
- 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>

- Additional information: The lists that were valid during the creation were used as basis.
- Personal protective equipment:
  - General protective and hygienic measures:
    Keep away from food and beverages.
    Immediately remove all soiled and contaminated clothing.
    Wash hands before breaks and at the end of work.
    Avoid contact with the eyes and skin.
Respiratory equipment:
In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.

Protection of hands:

- **Protective gloves**

  Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation of the glove material. Contact glove manufacturer for break-through time.

Eye protection:

- **Tightly sealed goggles**

### 9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Information</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Appearance</strong></td>
<td></td>
</tr>
<tr>
<td>Form</td>
<td>Fluid</td>
</tr>
<tr>
<td>Color</td>
<td>Various colors</td>
</tr>
<tr>
<td>Clear</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td></td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>Characteristic</td>
</tr>
<tr>
<td><strong>Odour threshold</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>pH-value</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Change in condition</strong></td>
<td></td>
</tr>
<tr>
<td>Melting point/Melting range</td>
<td>Undetermined.</td>
</tr>
<tr>
<td>Boiling point/Boiling range</td>
<td>120°C (248 °F)</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>30°C (86 °F)</td>
</tr>
<tr>
<td><strong>Flammability (solid, gaseous)</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Ignition temperature</strong></td>
<td>270°C (518 °F)</td>
</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Auto igniting</strong></td>
<td>Product is not selfigniting.</td>
</tr>
<tr>
<td><strong>Danger of explosion</strong></td>
<td>Product is not explosive.</td>
</tr>
<tr>
<td></td>
<td>However, formation of explosive air/vapor mixtures are possible.</td>
</tr>
<tr>
<td><strong>Explosion limits</strong></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>2.3 Vol %</td>
</tr>
<tr>
<td>Upper</td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Vapor pressure at 20°C (68 °F)</strong></td>
<td>12 hPa (9 mm Hg)</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Relative density</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Vapour density</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>Not determined.</td>
</tr>
</tbody>
</table>
Material Safety Data Sheet
acc. to ISO/DIS 11014

Trade name: LOR A Series Resists

- **Solubility in / Miscibility with Water:** Not miscible or difficult to mix.
- **Segregation coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
  - **Dynamic:** Not determined.
  - **Kinematic:** Not determined.

<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 0.5A</td>
<td>G516602</td>
<td>0.965</td>
<td>98</td>
<td>945</td>
</tr>
<tr>
<td>LOR 0.7A</td>
<td>G516603</td>
<td>0.968</td>
<td>97</td>
<td>940</td>
</tr>
<tr>
<td>LOR 1A</td>
<td>G516604</td>
<td>0.973</td>
<td>96</td>
<td>940</td>
</tr>
<tr>
<td>LOR 2A</td>
<td>G516605</td>
<td>0.977</td>
<td>95</td>
<td>935</td>
</tr>
<tr>
<td>LOR 3A</td>
<td>G516606</td>
<td>0.98</td>
<td>94</td>
<td>920</td>
</tr>
<tr>
<td>LOR 4A</td>
<td>G516607</td>
<td>0.982</td>
<td>93</td>
<td>915</td>
</tr>
<tr>
<td>LOR 5A</td>
<td>G516608</td>
<td>0.984</td>
<td>92</td>
<td>905</td>
</tr>
<tr>
<td>LOR 6A</td>
<td>G516609</td>
<td>0.986</td>
<td>92</td>
<td>905</td>
</tr>
<tr>
<td>LOR 7A</td>
<td>G516610</td>
<td>0.988</td>
<td>91</td>
<td>900</td>
</tr>
<tr>
<td>LOR 8A</td>
<td>G516611</td>
<td>0.988</td>
<td>90</td>
<td>895</td>
</tr>
<tr>
<td>LOR 10A</td>
<td>G516612</td>
<td>0.99</td>
<td>89</td>
<td>885</td>
</tr>
<tr>
<td>LOR 15A</td>
<td>G516613</td>
<td>0.99</td>
<td>87</td>
<td>860</td>
</tr>
<tr>
<td>LOR 20A</td>
<td>G516614</td>
<td>0.99</td>
<td>86</td>
<td>850</td>
</tr>
<tr>
<td>LOR 30A</td>
<td>G516615</td>
<td>0.99</td>
<td>84</td>
<td>830</td>
</tr>
<tr>
<td>LOR 50A</td>
<td>G516616</td>
<td>0.995</td>
<td>81</td>
<td>820</td>
</tr>
</tbody>
</table>

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Acute toxicity:**
  - **Primary irritant effect:**
    - on the skin: Irritant to skin and mucous membranes.
    - on the eye: Irritating effect.
  - **Sensitization:** No sensitizing effects known.

12 Ecological information

- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
  - Water hazard class 1 (Self-assessment): slightly hazardous for water
34.1.12 Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

13 Disposal considerations

- Waste treatment methods
  - Recommendation: No release to water in manufacturing, process, use or disposal.
- 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
  - ADR
  - RESIN SOLUTION
  - 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
  - Danger code (Kemler):
    - 33
  - EMS Number:
    - F-E,S-E

- Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
  - Not applicable.

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

- **Sara**
  - **Section 355 (extremely hazardous substances):**
    None of the ingredients is 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 is listed.
  - **Chemicals known to cause reproductive toxicity for males:**
    None of the ingredients is listed.
  - **Chemicals known to cause developmental toxicity:**
    None of the ingredients is listed.

- **Carcinogenic categories**
  - **EPA (Environmental Protection Agency)**
    None of the ingredients is listed.
  - **IARC (International Agency for Research on Cancer)**
    None of the ingredients is listed.
  - **NTP (National Toxicology Program)**
    None of the ingredients is listed.
  - **TLV (Threshold Limit Value established by ACGIH)**
    None of the ingredients is listed.
  - **NIOSH-Ca (National Institute for Occupational Safety and Health)**
    None of the ingredients is listed.
  - **OSHA-Ca (Occupational Safety & Health Administration)**
    None of the ingredients is listed.

- **GHS label elements** The product is classified and labelled according to the Globally Harmonized System (GHS).
  - **Hazard pictograms**
    ![GHS02](image1) ![GHS07](image2)
  - **Signal word** Warning
  - **Hazard statements**
    H226 Flammable liquid and vapor.
    H315 Causes skin irritation.
    H319 Causes serious eye irritation.
  - **Precautionary statements**
    P101 If medical advice is needed, have product container or label at hand.
 Trade name: LOR A Series Resists

P102 Keep out of reach of children.
P103 Read label before use.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P241 Use explosion-proof electrical/ventilating/lighting/equipment.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

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. Bedet
· 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
  ACGIH: American Conference of Governmental Industrial Hygienists
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)