

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.11.2022

Version number 6

Revision: 14.11.2022

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name:** LOR C Series Resists

· **Article number:** G713708, G713711, G713713, G713714, G713716

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Sector of Use** SU16 *Manufacture of computer, electronic and optical products, electrical equipment*

· **Product category** PC30 *Photo-chemicals*

· **Application of the substance / the mixture** *Photoresist*

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**

Kayaku Advanced Materials, Inc.

200 Flanders Road

Westborough, MA 01581

Tel: (617) 965-5511

Fax: (617) 965-5818

· **Further information obtainable from:**

Product Safety

Email: productsafety@kayakuAM.com

· **1.4 Emergency telephone number:**

Kayaku Advanced Materials : 617-965-5511

Chemtrec USA Emergency : 800-424-9300 (24 hr)

Chemtrec International Emergency : 703-527-3887 (24 hr)

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**



GHS02 flame

Flam. Liq. 3 H226 Flammable liquid and vapour.



GHS08 health hazard

Repr. 1B H360 May damage fertility or the unborn child.



GHS05 corrosion

Eye Dam. 1 H318 Causes serious eye damage.



GHS07

Skin Irrit. 2 H315 Causes skin irritation.

STOT SE 3 H336 May cause drowsiness or dizziness.

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 · **2.2 Label elements**

 · **Labelling according to Regulation (EC) No 1272/2008**

The product is classified and labelled according to the CLP regulation.

 · **Hazard pictograms**


GHS02 GHS05 GHS07 GHS08

 · **Signal word** *Danger*

 · **Hazard-determining components of labelling:**
gamma-Butyrolactone
Tetrahydrofurfuryl alcohol

 · **Hazard statements**
H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H360 May damage fertility or the unborn child.
H336 May cause drowsiness or dizziness.

 · **Precautionary statements**
P201 Obtain special instructions before use.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P304+P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use to extinguish: Alcohol resistant foam, Fire-extinguishing powder, 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.

 · **Additional information:**
Restricted to professional users.

 · **2.3 Other hazards**

 · **Results of PBT and vPvB assessment**

 · **PBT:** Not applicable.

 · **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

 · **3.2 Chemical characterisation: Mixtures**

 · **Description:** Mixture of substances listed below with nonhazardous additions.

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| · Dangerous components: | | |
|--|--|--------|
| CAS: 120-92-3 EINECS: 204-435-9 Index number: 606-025-00-9 Reg.nr.: 01-2119495595-21-0000 | Cyclopentanone Flam. Liq. 3, H226; Skin Irrit. 2, H315; Eye Irrit. 2, H319 | 10-40% |
| CAS: 96-48-0 EINECS: 202-509-5 | gamma-Butyrolactone Eye Dam. 1, H318; Acute Tox. 4, H302; STOT SE 3, H336 | 5-20% |
| CAS: 102322-80-5 | Polyaliphatic imide copolymer Skin Irrit. 2, H315; Eye Irrit. 2, H319 | 40-80% |
| CAS: 97-99-4 EINECS: 202-625-6 Index number: 603-061-00-7 | Tetrahydrofurfuryl alcohol Repr. 1B, H360; Eye Irrit. 2, H319 | 1-5% |
| | Proprietary Dye B Acute Tox. 4, H302; Skin Irrit. 2, H315; Eye Irrit. 2, H319 | <1% |

 · **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· 4.1 Description of first aid measures

· **General information:**

Immediately remove any clothing soiled by the product.

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

· **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:**

Wash eyes immediately with a large amount of water or normal saline, occasionally lifting upper and lower eye lids until no evidence of chemical remains (about 20 minutes). Remove contact lenses if present and easy to remove. Seek immediate medical attention.

· **After swallowing:** If symptoms persist consult doctor.

· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.

· **4.3 Indication of any immediate medical attention and special treatment needed** Treat symptomatically.

SECTION 5: Firefighting measures

· 5.1 Extinguishing media

· **Suitable extinguishing agents:**

Alcohol resistant foam

Fire-extinguishing powder

Carbon dioxide

· **For safety reasons unsuitable extinguishing agents:**

Water with full jet

Water

· **5.2 Special hazards arising from the substance or mixture** No further relevant information available.

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- **5.3 Advice for firefighters**
- **Protective equipment:** Wear self-contained respiratory protective device.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources.
- **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **6.3 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
- **6.4 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.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling**
Ensure good ventilation/exhaust at the workplace.
Prevent formation of aerosols.
Use only under yellow light
- **Information about fire - and explosion protection:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and containers:**
Store in a cool location.
Store in inert atmosphere or keep well sealed to prevent the formation of peroxides and other oxidation products.
- **Information about storage in one common storage facility:**
Do not store together with alkalis (caustic solutions).
Do not store together with oxidising and acidic materials.
- **Further information about storage conditions:**
Store in cool, dry conditions in well sealed containers.
Protect from heat and direct sunlight.
Store receptacle in a well ventilated area.
- **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **8.1 Control parameters**
- **Additional information about design of technical facilities:** No further data; see item 7.
- **Ingredients with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

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 · **Additional information:** The lists valid during the making were used as basis.

 · **8.2 Exposure controls**

 · **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 protection:**

In case of low exposure use cartridge respirator. In case of intensive or longer exposure use self-contained respiratory protective device.

 · **Protection of hands:**


Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

 · **Material of gloves** Nitrile rubber, NBR

 · **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

 · **Eye protection:**


Tightly sealed goggles

SECTION 9: Physical and chemical properties

 · **9.1 Information on basic physical and chemical properties**

 · **General Information**

 · **Appearance:**

| | |
|-------------------------|-----------------|
| Form: | Liquid |
| Colour: | Yellow-brown |
| Odour: | Sweetish |
| Odour threshold: | Not determined. |

 · **pH-value:** Not determined.

 · **Change in condition**

| | |
|---|---------------|
| Melting point/freezing point: | Undetermined. |
| Initial boiling point and boiling range: | 130 °C |

 · **Flash point:** 30 °C

 · **Flammability (solid, gas):** Not applicable.

 · **Ignition temperature:** 430 °C

 · **Decomposition temperature:** Not determined.

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| · Auto-ignition temperature: | Product is not selfigniting. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-----------|----------------|-----------|----------------|----------|--------|---------|--------|-------|-----|---------|---------|--------|-------|-----|---------|---------|--------|-------|-----|---------|---------|--------|-------|-----|---------|---------|--------|-------|-----|
| · Explosive properties: | Product is not explosive. However, formation of explosive air/vapour mixtures are possible. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Explosion limits: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lower: | 2.7 Vol % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Upper: | 15.6 Vol % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Vapour pressure at 20 °C: | 1 hPa | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Density: | Not determined | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Relative density | Not determined. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Vapour density | Not determined. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Evaporation rate | Not determined. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Solubility in / Miscibility with water: | Partly miscible. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Partition coefficient: n-octanol/water: | Not determined. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · Viscosity: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dynamic: | Not determined. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kinematic: | Not determined. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| · 9.2 Other information | Table 1. Product specific gravity and VOC data. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <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 5C</td> <td>G713708</td> <td>1.0207</td> <td>35-40</td> <td>400</td> </tr> <tr> <td>LOR 10C</td> <td>G713711</td> <td>1.0296</td> <td>25-30</td> <td>300</td> </tr> <tr> <td>LOR 15C</td> <td>G713713</td> <td>1.0346</td> <td>20-25</td> <td>240</td> </tr> <tr> <td>LOR 20C</td> <td>G713714</td> <td>1.0383</td> <td>15-20</td> <td>200</td> </tr> <tr> <td>LOR 30C</td> <td>G713716</td> <td>1.0418</td> <td>10-15</td> <td>140</td> </tr> </tbody> </table> | Name | Number | Sp. Grav. | Vol. (%by wt.) | VOC(g/L) | LOR 5C | G713708 | 1.0207 | 35-40 | 400 | LOR 10C | G713711 | 1.0296 | 25-30 | 300 | LOR 15C | G713713 | 1.0346 | 20-25 | 240 | LOR 20C | G713714 | 1.0383 | 15-20 | 200 | LOR 30C | G713716 | 1.0418 | 10-15 | 140 |
| Name | Number | Sp. Grav. | Vol. (%by wt.) | VOC(g/L) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOR 5C | G713708 | 1.0207 | 35-40 | 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOR 10C | G713711 | 1.0296 | 25-30 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOR 15C | G713713 | 1.0346 | 20-25 | 240 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOR 20C | G713714 | 1.0383 | 15-20 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOR 30C | G713716 | 1.0418 | 10-15 | 140 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

SECTION 10: Stability and reactivity

- **10.1 Reactivity** No further relevant information available.
- **10.2 Chemical stability** Stable
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **10.3 Possibility of hazardous reactions** No dangerous reactions known.
- **10.4 Conditions to avoid**
Heat, flames and sparks. Extremes of temperature and direct sunlight.
Contact with incompatible materials.
- **10.5 Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **10.6 Hazardous decomposition products:** Carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity** Based on available data, the classification criteria are not met.

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· **LD/LC50 values relevant for classification:****120-92-3 Cyclopentanone**

| | | |
|------------|----------|----------------------|
| Oral | LD50 | 1180 mg/kg (Rat) |
| Dermal | LD50 | >2000 mg/kg (rabbit) |
| Inhalative | LC50/4 h | >19.5 mg/l (Rat) |

96-48-0 gamma-Butyrolactone

| | | |
|------------|----------|------------------|
| Oral | LD50 | 1540 mg/kg (Rat) |
| Dermal | LD50 | 5000 mg/kg (gui) |
| Inhalative | LC50/4 h | >5.1 mg/l (Rat) |

97-99-4 Tetrahydrofurfuryl alcohol

| | | |
|------|------|------------------|
| Oral | LD50 | 1600 mg/kg (Rat) |
|------|------|------------------|

· **Primary irritant effect:**· **Skin corrosion/irritation**

Causes skin irritation.

· **Serious eye damage/irritation**

Causes serious eye damage.

· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.· **Experience with humans:** No further relevant information available.· **Additional toxicological information:**· **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)**· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.· **Carcinogenicity** Based on available data, the classification criteria are not met.· **Reproductive toxicity**

May damage fertility or the unborn child.

· **STOT-single exposure**

May cause drowsiness or dizziness.

· **STOT-repeated exposure** Based on available data, the classification criteria are not met.· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**· **Aquatic toxicity:****120-92-3 Cyclopentanone**

| | |
|-----------|-------------------------------------|
| EC50/48 h | 100 mg/l (daphnia magna) |
| EC50/72 h | >100 mg/l (scenedesmus subspicatus) |
| LC50/96 h | >100 mg/l (fish) |

96-48-0 gamma-Butyrolactone

| | |
|-----------|--------------------------------|
| EC50/17 h | >10000 mg/l (bacterium) |
| EC50/48 h | >500 mg/l (daphnia magna) |
| EC50/72 h | 360 mg/l (green algae) |
| LC50/96 h | >220 - <460 mg/l (golden orfe) |

· **12.2 Persistence and degradability** No further relevant information available.· **12.3 Bioaccumulative potential** No further relevant information available.· **12.4 Mobility in soil** No further relevant information available.

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- **Additional ecological information:**
- **General notes:**
 Water hazard class 1 (German Regulation) (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.
- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

- **13.1 Waste treatment methods**
- **Recommendation**
 Must not be disposed together with household garbage. Do not allow product to reach sewage system.
 Disposal must be made in accordance with International, National, and regional regulations.
- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.

SECTION 14: Transport information

| | |
|--|---|
| · 14.1 UN-Number · ADR, IMDG, IATA | UN1866 |
| · 14.2 UN proper shipping name · ADR, IMDG, IATA | RESIN SOLUTION |
| · 14.3 Transport hazard class(es) · ADR, IMDG, IATA | |
|  | |
| · Class · Label | 3 Flammable liquids. 3 |
| · 14.4 Packing group · ADR, IMDG, IATA | III |
| · 14.5 Environmental hazards: · Marine pollutant: | No |
| · 14.6 Special precautions for user · Hazard identification number (Kemler code): · EMS Number: | Warning: Flammable liquids. 30 F-E, S-E |
| · 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code | Not applicable. |
| · Transport/Additional information: | |
| · ADR · Limited quantities (LQ) | 5L |

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| | |
|----------------------------------|--------------------------------|
| · Transport category | 3 |
| · Tunnel restriction code | D/E |
| · UN "Model Regulation": | UN1866, RESIN SOLUTION, 3, III |

SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Directive 2012/18/EU**
- **Qualifying quantity (tonnes) for the application of lower-tier requirements** 5.000 t
- **Qualifying quantity (tonnes) for the application of upper-tier requirements** 50.000 t
- **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3, 30
- **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 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.

- **Relevant phrases**

H226 Flammable liquid and vapour.

H302 Harmful if swallowed.

H315 Causes skin irritation.

H318 Causes serious eye damage.

H319 Causes serious eye irritation.

H336 May cause drowsiness or dizziness.

H360 May damage fertility or the unborn child.

- **Classification according to Regulation (EC) No 1272/2008**

Art. 9(1) of Regulation (EC) No. 1272/2008 was used for classification purposes.

- **Department issuing SDS:** Product safety department

· **Contact:** Tom Cole, EHS Manager (tcole@kayakuAM.com)

- **Revision History:**

The manufacturer's information in Section 1, the product hazard information in Section 2 and the component hazard information in Section 3 have been updated.

- **Abbreviations and acronyms:**

ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

Flam. Liq. 3: Flammable liquids – Category 3

Acute Tox. 4: Acute toxicity – Category 4

Skin Irrit. 2: Skin corrosion/irritation – Category 2

Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Eye Irrit. 2: Serious eye damage/eye irritation – Category 2

Repr. 1B: Reproductive toxicity – Category 1B

STOT SE 3: Specific target organ toxicity (single exposure) – Category 3