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

*Printing date 02.05.2023* *Version number 7 (replaces version 6)* *Revision: 02.05.2023*

## 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.
· **Determination of endocrine-disrupting properties**
None of the ingredients are included in the list established in accordance with Article 59(1) for having endocrine disrupting properties.
None of the ingredients are substances identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 (or Commission Regulation (EU) 2018/605.



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## SECTION 3: Composition/information on ingredients

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

| · **Dangerous components:** | | |
|---|---|---|
| CAS: 120-92-3<br>EINECS: 204-435-9<br>Index number: 606-025-00-9<br>Reg.nr.: 01-2119495595-21-0000 | Cyclopentanone<br>Flam. Liq. 3, H226; Skin Irrit. 2, H315; Eye Irrit. 2, H319 | 10-40% |
| CAS: 96-48-0<br>EINECS: 202-509-5 | gamma-Butyrolactone<br>Eye Dam. 1, H318; Acute Tox. 4, H302; STOT SE 3, H336 | 5-20% |
| CAS: 102322-80-5 | Polyaliphatic imide copolymer<br>Skin Irrit. 2, H315; Eye Irrit. 2, H319 | 40-80% |
| CAS: 97-99-4<br>EINECS: 202-625-6<br>Index number: 603-061-00-7 | Tetrahydrofurfuryl alcohol<br>Repr. 1B, H360; Eye Irrit. 2, H319 | 1-5% |
| | Proprietary Dye B<br>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*
· **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***
· ***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***
· ***Appropriate engineering controls*** *No further data; see section 7.*
· ***Individual protection measures, such as 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.*
· ***Hand protection***

*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/face protection***

*Tightly sealed goggles*

· ***Body protection:*** *Long-sleeved work clothes*

## *SECTION 9: Physical and chemical properties*

| | |
|---|---|
| · ***9.1 Information on basic physical and chemical properties*** | |
| · ***General Information*** | |
| · ***Physical state*** | *Liquid* |
| · ***Colour:*** | *Yellow-brown* |
| · ***Odour:*** | *Sweetish* |
| · ***Odour threshold:*** | *Not determined.* |
| · ***Melting point/freezing point:*** | *Undetermined.* |
| · ***Boiling point or initial boiling point and boiling range*** | *130 °C* |
| · ***Flammability*** | *Not applicable.* |
| · ***Lower and upper explosion limit*** | |
| · ***Lower:*** | *2.7 Vol %* |
| · ***Upper:*** | *15.6 Vol %* |
| · ***Flash point:*** | *30 °C* |
| · ***Auto-ignition temperature:*** | *430 °C* |
| · ***Decomposition temperature:*** | *Not determined.* |
| · ***pH*** | *Not determined.* |

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| | |
|---|---|
| · **Viscosity:** | |
| · **Kinematic viscosity** | Not determined. |
| · **Dynamic:** | Not determined. |
| · **Solubility** | |
| · **water:** | Insoluble. |
| · **Partition coefficient n-octanol/water (log value)** | Not determined. |
| · **Vapour pressure at 20 °C:** | 1 hPa |
| · **Density and/or relative density** | |
| · **Density:** | Not determined |
| · **Relative density** | See Other information |
| · **Vapour density** | Not determined. |

· **9.2 Other information**

| Name | Number | Sp. Grav. | VOC(%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 |

| | |
|---|---|
| · **Appearance:** | |
| · **Form:** | Liquid |
| · **Important information on protection of health and environment, and on safety.** | |
| · **Ignition temperature:** | Product is not selfigniting. |
| · **Explosive properties:** | Product is not explosive. However, formation of explosive air/vapour mixtures are possible. |
| · **Change in condition** | |
| · **Evaporation rate** | Not determined. |

| | |
|---|---|
| · **Information with regard to physical hazard classes** | |
| · **Explosives** | Void |
| · **Flammable gases** | Void |
| · **Aerosols** | Void |
| · **Oxidising gases** | Void |
| · **Gases under pressure** | Void |
| · **Flammable liquids** | |
| Flammable liquid and vapour. | |
| · **Flammable solids** | Void |
| · **Self-reactive substances and mixtures** | Void |
| · **Pyrophoric liquids** | Void |
| · **Pyrophoric solids** | Void |
| · **Self-heating substances and mixtures** | Void |
| · **Substances and mixtures, which emit flammable gases in contact with water** | |
| Void | |
| · **Oxidising liquids** | Void |
| · **Oxidising solids** | Void |
| · **Organic peroxides** | Void |
| · **Corrosive to metals** | Void |

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· **Desensitised explosives** Void

## 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
Hydrocarbons
Nitrogen oxides (NOx)

## SECTION 11: Toxicological information

· **11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008**
· **Acute toxicity** Based on available data, the classification criteria are not met.

| · **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) |

· **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.
· **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.
· **Experience with humans:** No further relevant information available.

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· **11.2 Information on other hazards**

| · **Endocrine disrupting properties** |
|---|
| None of the ingredients is listed. |

## 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.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Endocrine disrupting properties**
The product does not contain substances with endocrine disrupting properties.
· **12.7 Other adverse effects**
· **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.

## 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 or ID number**
· **ADR, IMDG, IATA** UN1866

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| | |
|---|---|
| · **14.2 UN proper shipping name** | |
| · **ADR, IMDG, IATA** | RESIN SOLUTION |
| · **14.3 Transport hazard class(es)** | |
| · **ADR, IMDG, IATA** | |

| | |
|---|---|
| · **Class** | 3 Flammable liquids. |
| · **Label** | 3 |
| · **14.4 Packing group** | |
| · **ADR, IMDG, IATA** | III |
| · **14.5 Environmental hazards:** | |
| · **Marine pollutant:** | No |
| · **14.6 Special precautions for user** | Warning: Flammable liquids. |
| · **Hazard identification number (Kemler code):** | 30 |
| · **EMS Number:** | F-E,S-E |
| · **14.7 Maritime transport in bulk according to IMO instruments** | Not applicable. |
| · **Transport/Additional information:** | |
| · **ADR** | |
| · **Limited quantities (LQ)** | 5L |
| · **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

· **DIRECTIVE 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment – Annex II**

None of the ingredients is listed.

· **REGULATION (EU) 2019/1148**

· **Annex I - RESTRICTED EXPLOSIVES PRECURSORS (Upper limit value for the purpose of licensing under Article 5(3))**

None of the ingredients is listed.

· **Annex II - REPORTABLE EXPLOSIVES PRECURSORS**

None of the ingredients is listed.

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· **Regulation (EC) No 273/2004 on drug precursors**

None of the ingredients is listed.

· **Regulation (EC) No 111/2005 laying down rules for the monitoring of trade between the Community and third countries in drug precursors**

None of the ingredients is listed.

· **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.
· **Version number of previous version:** 6
· **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