

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/10/2024

Reviewed on 12/10/2024

1 Identification

- **Product identifier**
- **Trade name:** LOR C Series Resists
- **Product number:** G713708, G713711, G713713, G713714, G713716
- **Application of the substance / the mixture** Photoresist
- **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
- **Information department:**
 Product Safety
 Email: productsafety@kayakuam.com
- **Emergency telephone number:**
 Kayaku Advanced Materials : 617-965-5511
 Chemtrec USA Emergency : 800-424-9300
 Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flammable Liquids 3

H226 Flammable liquid and vapor.



GHS08 Health hazard

Toxic to Reproduction 1B

H360 May damage fertility or the unborn child.



GHS05 Corrosion

Eye Damage 1

H318 Causes serious eye damage.



GHS07

Skin Irritation 2

H315 Causes skin irritation.

Specific Target Organ Toxicity - Single Exposure 3 H336 May cause drowsiness or dizziness.

- **Label elements**

- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

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· Hazard pictograms

· Signal word Danger
· Hazard-determining components of labeling:

gamma-Butyrolactone

Tetrahydrofurfuryl alcohol

· Hazard statements

H226 Flammable liquid and vapor.

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/vapors/spray

P280 Wear protective gloves/protective clothing/eye protection/face 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 person to fresh air and keep 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.

· Classification system:
· NFPA ratings (scale 0 - 4)

· HMIS-ratings (scale 0 - 4)

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

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 · **vPvB:** Not applicable.

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3 Composition/information on ingredients

 · **Chemical characterization:** Mixtures

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

 · **Dangerous components:**

120-92-3	Cyclopentanone ⚠ Flammable Liquids 3, H226; ⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319	10-40%
96-48-0	gamma-Butyrolactone ⚠ Eye Damage 1, H318; ⚠ Acute Toxicity - Oral 4, H302; Specific Target Organ Toxicity - Single Exposure 3, H336	5-20%
102322-80-5	Polyaliphatic imide copolymer ⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319	40-80%
97-99-4	Tetrahydrofurfuryl alcohol ⚠ Toxic to Reproduction 1B, H360; ⚠ Eye Irritation 2A, H319	1-5%
	Proprietary Dye B ⚠ Acute Toxicity - Oral 4, H302; Skin Irritation 2, H315; Eye Irritation 2A, H319	<1%

4 First-aid measures

 · **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:**

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** Treat symptomatically.

5 Fire-fighting measures

 · **Extinguishing media**

 · **Suitable extinguishing agents:**

Alcohol resistant foam

Fire-extinguishing powder

Carbon dioxide

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- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **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
 Keep away from ignition sources
- **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **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.
- **Protective Action Criteria for Chemicals**

· PAC-1:

120-92-3	Cyclopentanone	0.87 ppm
96-48-0	gamma-Butyrolactone	3.6 mg/m ³

· PAC-2:

120-92-3	Cyclopentanone	9.5 ppm
96-48-0	gamma-Butyrolactone	39 mg/m ³

· PAC-3:

120-92-3	Cyclopentanone	57 ppm
96-48-0	gamma-Butyrolactone	310 mg/m ³

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
 Ensure good ventilation/exhaust at the workplace.
 Prevent formation of aerosols.
 Use only under yellow light
- **Information about protection against explosions and fires:**
 Keep ignition sources away - Do not smoke.
 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.
 Store in inert atmosphere or keep well sealed to prevent the formation of peroxides and other oxidation products.

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- **Information about storage in one common storage facility:**
 Do not store together with alkalis (caustic solutions).
 Do not store together with oxidizing and acidic materials.
- **Further information about storage conditions:**
 Keep container well-sealed in cool, dry location.
 Protect from heat and direct sunlight.
 Store receptacle in a well ventilated area.
- **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 section 7.
- **Control parameters**
- **Components with limit values that require monitoring at the workplace:**
 The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit.
 At this time, the other constituents have no known exposure limits.

97-99-4 Tetrahydrofurfuryl alcohol	
WEEL	0.5 ppm

- **Additional information:** The lists that were valid during the creation were used as basis.
- **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 equipment:**
 In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
- **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** Contact glove manufacture for break-through time.
- **Eye protection:**



Tightly sealed goggles

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

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9 Physical and chemical properties

· Information on basic physical and chemical properties

· General Information

· Appearance:

Form:	Liquid
Color:	Yellow-brown
Odor:	Sweet
Odor threshold:	Not determined.

· pH-value: Not determined.

· Change in condition

Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	130 °C (266 °F)

· Flash point: 30 °C (86 °F)

· Flammability: Not applicable.

· Auto igniting: 430 °C (806 °F)

· Decomposition temperature: Not determined.

· Ignition temperature: Product is not selfigniting.

· Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

· Explosion limits:

Lower:	2.7 Vol %
Upper:	15.6 Vol %

· Vapor pressure at 20 °C (68 °F): 1 hPa (0.8 mm Hg)

Density:	Not determined.
Relative density	See Other information
Vapor density	Not determined.
Evaporation rate	Not determined.

· Solubility in / Miscibility with

Water: Insoluble.

· Partition coefficient (n-octanol/water): Not determined.

· Viscosity:

Dynamic:	Not determined.
Kinematic:	Not determined.

· 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

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10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability** Stable
- **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.
 Contact with incompatible materials.
- **Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **Hazardous decomposition products:**
 Carbon monoxide and carbon dioxide
 Hydrocarbons
 Nitrogen oxides (NO_x)

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)
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)
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- **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:
 Harmful
 Irritant

- **Carcinogenic categories**

 · **IARC (International Agency for Research on Cancer)**

96-48-0 gamma-Butyrolactone	3
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 · **NTP (National Toxicology Program)**

None of the ingredients are listed.

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· OSHA-Ca (Occupational Safety & Health Administration)

None of the ingredients are listed.

12 Ecological information

· 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)

· Persistence and degradability No further relevant information available.

· Behavior in environmental systems:
· Bioaccumulative potential 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.

· Other adverse effects No further relevant information available.

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, ADR

Resin solution

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 · **IMDG, IATA** 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

 · **Hazard identification number (Kemler code):** 30

 · **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

 · **Safety, health and environmental regulations/legislation specific for the substance or mixture**

 · **Sara**

 · **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.

 · **Hazardous Air Pollutants**

None of the ingredients are listed.

 · **Proposition 65**

 · **Chemicals known to cause cancer:**

None of the ingredients are listed.

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· 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)

None of the ingredients are listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients are listed.

· Massachusetts State Right To Know List

120-92-3 Cyclopentanone

97-99-4 Tetrahydrofurfuryl alcohol

· New Jersey State Right To Know List

120-92-3 Cyclopentanone

96-48-0 gamma-Butyrolactone

· Pennsylvania Hazardous Substances List

120-92-3 Cyclopentanone

96-48-0 gamma-Butyrolactone

97-99-4 Tetrahydrofurfuryl alcohol

· California SCAQMD Rule 443.1 VOC's: No information available.
· GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms


GHS02 GHS05 GHS07 GHS08

· Signal word Danger

· Hazard-determining components of labeling:

gamma-Butyrolactone

Tetrahydrofurfuryl alcohol

· Hazard statements

H226 Flammable liquid and vapor.

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/vapors/spray

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- P280 Wear protective gloves/protective clothing/eye protection/face 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 person to fresh air and keep 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.

· **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 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.

- **Date of preparation / last revision** 12/10/2024 / 7

· **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

DOT: US Department of Transportation

IATA: International Air Transport Association

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)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

Flammable Liquids 3: Flammable liquids – Category 3

Acute Toxicity - Oral 4: Acute toxicity – Category 4

Skin Irritation 2: Skin corrosion/irritation – Category 2

Eye Damage 1: Serious eye damage/eye irritation – Category 1

Eye Irritation 2A: Serious eye damage/eye irritation – Category 2A

Toxic to Reproduction 1B: Reproductive toxicity – Category 1B

Specific Target Organ Toxicity - Single Exposure 3: Specific target organ toxicity (single exposure) – Category 3