

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

1 Identification

- **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 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.



GHS07

Skin Irritation 2 H315 Causes skin irritation.

Eye Irritation 2A H319 Causes serious eye irritation.

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



GHS02 GHS07

- **Signal word** Warning
- **Hazard-determining components of labeling:**
 Cyclopentanone
- **Hazard statements**
 H226 Flammable liquid and vapor.

(Contd. on page 2)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 1)

H315 Causes skin irritation.

H319 Causes serious eye irritation.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P260 Do not breathe 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.

P333+P313 If skin irritation or rash 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:** No release to water in manufacturing, process, use or disposal.

 · **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.

Dangerous components:

120-92-3	Cyclopentanone	65-90%
	⚠ Flammable Liquids 3, H226; ⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319	
107-98-2	1-methoxy-2-propanol	5-25%
	⚠ Flammable Liquids 3, H226; ⚠ Specific Target Organ Toxicity - Single Exposure 3, H336	
102322-80-5	Polyaliphatic imide copolymer	1-20%
	⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319	

(Contd. on page 3)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 2)

Additional Components:

Proprietary Dye A

<1%

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.

If skin irritation continues, consult a doctor.

· **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

· **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

Keep away from ignition sources

· **Environmental precautions:**

Do not allow to enter sewers/ surface or ground water.

No release to water in manufacturing, processing, use, or disposal.

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 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
- **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**
 No release to water in manufacturing, process, use or disposal.
 Ensure good ventilation/exhaust at the workplace.
 Prevent formation of aerosols.
 Keep receptacles tightly sealed.
 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.
- **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:**

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

REL	Short-term value: 540 mg/m ³ , 150 ppm Long-term value: 360 mg/m ³ , 100 ppm
TLV	Short-term value: (553) NIC-369 mg/m ³ , (150) NIC-100 ppm Long-term value: (369) NIC-184 mg/m ³ , (100) NIC-50 ppm NIC-A4

- **Additional information:** The lists that were valid during the creation were used as basis.

(Contd. on page 5)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 4)

- **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.
 - Do not inhale gases / fumes / aerosols.
- **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

9 Physical and chemical properties

· Information on basic physical and chemical properties

· General Information

· Appearance:

Form:	Liquid
Color:	Red
Odor:	Slightly sweet
Odor 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.

· **Auto igniting:** 270 °C (518 °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.

(Contd. on page 6)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 5)

· Explosion limits:

Lower: 2.3 Vol %
Upper: Not determined.

· Vapor pressure at 20 °C (68 °F): 12 hPa (9 mm Hg)

· Density: Not determined.
· Relative density See Table 1 Other Information
· Vapor 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.

Name	Number	Sp. Grav.	Vol.(%by wt.)	VOC(g/L)
LOR 0.5A	G516602	0.946	98	930
LOR 0.7A	G516603	0.948	97	925
LOR 1A	G516604	0.951	96	920
LOR 2A	G516605	0.953	95	910
LOR 3A	G516606	0.958	94	900
LOR 4A	G516607	0.961	93	895
LOR 5A	G516608	0.964	92	890
LOR 6A	G516658	0.965	92	885
LOR 7A	G516609	0.966	91	880
LOR 8A	G516610	0.968	90	875
LOR 10A	G516611	0.971	89	870
LOR 15A	G516612	0.978	87	855
LOR 20A	G516614	0.982	86	845
LOR 30A	G516616	0.989	84	830
LOR 50A	G516619	0.992	81	800

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

(Contd. on page 7)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

Nitrogen oxides (NOx)

(Contd. of page 6)

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)

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.

No information

 · **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.

 · **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients are listed.

 · **Germ cell mutagenicity** No information

 · **Carcinogenicity** No information

 · **Reproductive toxicity** No information

 · **Specific target organ toxicity - single exposure** No information

 · **Specific target organ toxicity - repeated exposure** No information

 · **Aspiration hazard** No information

US

(Contd. on page 8)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 7)

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)

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

EC50/96 hr	23300 mg/l (daphnia magna)
	>1000 mg/l (green algae)
LC50/96 h	20800 mg/l (Pimephales promelas)

· **Persistence and degradability** Moderately /partly biodegradable

· **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, IMDG, IATA** RESIN SOLUTION

· **ADR** 1866 RESIN SOLUTION

(Contd. on page 9)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 8)

 · **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):**

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

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.

 · **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.

(Contd. on page 10)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 9)

· 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

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 labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms


GHS02 GHS07

· Signal word Warning

· Hazard-determining components of labeling:

Cyclopentanone

· Hazard statements

H226 Flammable liquid and vapor.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

· Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P260 Do not breathe 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.

P333+P313 If skin irritation or rash occurs: Get medical advice/attention.

(Contd. on page 11)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/04/2023

Reviewed on 04/04/2023

Trade name: LOR A Series Resists

(Contd. of page 10)

- 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** 04/04/2023

- **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 Organisation

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

Skin Irritation 2: Skin corrosion/irritation – Category 2

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

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