

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 03.05.2023

Version number 5 (replaces version 4)

Revision: 03.05.2023

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

- **1.1 Product identifier**
- **Trade name:** PermiNex® 2000 Series Resists
- **Article number:** Y614022, Y614045, Y614058, Y614064
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
- **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.



GHS09 environment

 Aquatic Chronic 2 H411 Toxic to aquatic life with long lasting effects.



GHS07

Skin Irrit. 2	H315 Causes skin irritation.
Eye Irrit. 2	H319 Causes serious eye irritation.
Skin Sens. 1	H317 May cause an allergic skin reaction.

- **2.2 Label elements**
- **Labelling according to Regulation (EC) No 1272/2008**
 The product is classified and labelled according to the CLP regulation.

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· Hazard pictograms



· Signal word *Warning*

· Hazard-determining components of labelling:

Epoxy Resin M2

· Hazard statements

H226 Flammable liquid and vapour.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H317 May cause an allergic skin reaction.

H411 Toxic to aquatic life with long lasting effects.

· Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P273 Avoid release to the environment.

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.

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:

41.8 % of the mixture consists of component(s) of unknown toxicity.

Contains 59.2 % of components with unknown hazards to the aquatic environment.

· 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 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	15-75%
	Epoxy Resin M2 Aquatic Chronic 2, H411; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317	5-25%
	Epoxy Resin M3 Aquatic Chronic 2, H411; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317	1-10%
CAS: 2530-83-8 EINECS: 219-784-2	[3-(2,3-epoxypropoxy)propyl]trimethoxysilane Eye Dam. 1, H318	<1.5%

Additional Components:

Proprietary modified epoxy resin	15-50%
Proprietary Photoacid Generator	<1.5%

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.

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

ABC powder

For safety reasons unsuitable extinguishing agents:

Water with full jet

Water

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- **5.2 Special hazards arising from the substance or mixture** No further relevant information available.
- **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.
- **Information about fire - and explosion protection:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Use explosion-proof apparatus / fittings and spark-proof tools.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and containers:**
Due to photo-sensitivity, store product in brown-glass or stainless steel receptacles.
- **Information about storage in one common storage facility:**
Do not store together with oxidising and acidic materials.
Do not store together with alkalis (caustic solutions).
- **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:**

Clear to light yellow

 · **Odour:**

Mild

 · **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:**

1.3 Vol %

 · **Upper:**

0.0 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:	Not miscible or difficult to mix.																									
· Partition coefficient n-octanol/water (log value)	Not determined.																									
· Vapour pressure at 20 °C:	11 hPa																									
· Density and/or relative density																										
· Density:	Not determined																									
· Relative density	See Other information																									
· Vapour density	Not determined.																									
· 9.2 Other information	<table><tr><th>Name</th><th>Number</th><th>Sp. Grav.</th><th>VOC(%by wt.)</th><th>VOC(g/L)</th></tr><tr><td>PN 2001</td><td>Y614022</td><td>1.0018</td><td>70-75</td><td>710</td></tr><tr><td>PN 2005</td><td>Y614045</td><td>1.0619</td><td>40-45</td><td>445</td></tr><tr><td>PN 2010</td><td>Y614058</td><td>1.1020</td><td>25-30</td><td>290</td></tr><tr><td>PN 2015</td><td>Y614064</td><td>1.1220</td><td>15-20</td><td>190</td></tr></table>	Name	Number	Sp. Grav.	VOC(%by wt.)	VOC(g/L)	PN 2001	Y614022	1.0018	70-75	710	PN 2005	Y614045	1.0619	40-45	445	PN 2010	Y614058	1.1020	25-30	290	PN 2015	Y614064	1.1220	15-20	190
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PN 2015	Y614064	1.1220	15-20	190																						
· 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																									
· Desensitised explosives	Void																									

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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** Exothermic polymerisation.
- **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
 Corrosive gases/vapours
 Danger of forming toxic pyrolysis products.

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:

Epoxy Resin M2

Oral	LD50	>2000 mg/kg (Rat)
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2530-83-8 [3-(2,3-epoxypropoxy)propyl]trimethoxysilane

Oral	LD50	8030 mg/kg (Rat)
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Dermal	LD50	4248 mg/kg (Rat)
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Inhalative	LC50/4 h	> 5.3 mg/l (Rat)
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120-92-3 Cyclopentanone

Oral	LD50	1820 mg/kg (Rat)
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Dermal	LD50	>2000 mg/kg (rabbit)
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Inhalative	LC50/4 h	19.5 mg/l (Rat)
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- **Skin corrosion/irritation**
 Causes skin irritation.
- **Serious eye damage/irritation**
 Causes serious eye irritation.
- **Respiratory or skin sensitisation**
 May cause an allergic skin reaction.
- **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** Based on available data, the classification criteria are not met.
- **STOT-single exposure** Based on available data, the classification criteria are not met.
- **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.
- **11.2 Information on other hazards**

· **Endocrine disrupting properties**

None of the ingredients is listed.

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SECTION 12: Ecological information

· 12.1 Toxicity

· Aquatic toxicity:

2530-83-8 [3-(2,3-epoxypropoxy)propyl]trimethoxysilane

LC50/96 h	55 mg/l (Cyprinus carpio (common carp))
EC50/48 h	30 mg/l (daphnia magna)
EC50/72 h	255 mg/l (Desmodesmus subscipatus (green algae))

120-92-3 Cyclopentanone

LC50/48 hr	2950 mg/L (golden orfe)
LC50/96 h	>100 mg/l (fish)
EC50/48 h	3600 mg/l (Ceriodaphnia dubia (water flea))
	100 mg/l (daphnia magna)
EC50/72 h	>100 mg/l (scenedesmus subspicatus)

 · **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

· 14.2 UN proper shipping name

 · **ADR, IATA** RESIN SOLUTION
 · **IMDG** RESIN SOLUTION, MARINE POLLUTANT

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· 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:

 Product contains environmentally hazardous substances:
 Formaldehyde, polymer with 1-chloro-2,3-epoxypropane and phenol

· 14.6 Special precautions for user

Warning: Flammable liquids.

· Hazard identification number (Kemler code):

30

· EMS Number:

 F-E,S-E
· Stowage Category

A

· 14.7 Maritime transport in bulk according to IMO instruments

Not applicable.

· Transport/Additional information:
· ADR
· Limited quantities (LQ)

5L

· Excepted quantities (EQ)

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

· Transport category

3

· Tunnel restriction code

D/E

· IMDG
· Limited quantities (LQ)

5L

· Excepted quantities (EQ)

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

· UN "Model Regulation":

UN 1866 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
· Named dangerous substances - ANNEX I None of the ingredients is listed.

· Seveso category

E2 Hazardous to the Aquatic Environment

P5c FLAMMABLE LIQUIDS

· Qualifying quantity (tonnes) for the application of lower-tier requirements 200 t

· Qualifying quantity (tonnes) for the application of upper-tier requirements 500 t

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 · **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

 · **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.

 · **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.

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H318 Causes serious eye damage.

H319 Causes serious eye irritation.

H411 Toxic to aquatic life with long lasting effects.

· **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:** 4

· **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

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

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