

## Safety Data Sheet

acc. to OSHA HCS

Printing date 12/15/2022

Reviewed on 12/15/2022

### 1 Identification

- **Product identifier**
- **Trade name:** PermiNex® 2000 Series Resists
- **Product number:** Y614022, Y614045, Y614058, Y614064
- **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](mailto: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.



GHS09 Environment

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



GHS07

 Skin Irritation 2 H315 Causes skin irritation.  
 Eye Irritation 2A H319 Causes serious eye irritation.  
 Sensitization - Skin 1 H317 May cause an allergic skin reaction.

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



GHS02



GHS07



GHS09

- **Signal word** Warning

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**Trade name: PermiNex® 2000 Series Resists**

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· **Hazard-determining components of labeling:**

Epoxy Resin M2

· **Hazard statements**

H226 Flammable liquid and vapor.

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/sparks/open flames/hot surfaces. - No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapors/spray

P273 Avoid release to the environment.

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:**

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

· **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.

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<b>· Dangerous components:</b>		
120-92-3	Cyclopentanone ⚠ Flammable Liquids 3, H226; ⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319	15-75%
	Epoxy Resin M2 ⚠ Aquatic Chronic 2, H411; ⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319; Sensitization - Skin 1, H317	5-25%
	Epoxy Compound ⚠ Eye Damage 1, H318	<1.5%
	Epoxy Resin M3 ⚠ Aquatic Chronic 2, H411; ⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319; Sensitization - Skin 1, H317	1-10%
<b>· Additional Components:</b>		
	Proprietary modified epoxy resin	15-50%
	Proprietary Photoacid Generator	<1.5%

### 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.
- **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  
ABC powder
- **For safety reasons unsuitable extinguishing agents:**  
Water with full jet  
Water
- **Special hazards arising from the substance or mixture** No further relevant information available.

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- **Advice for firefighters**
- **Protective equipment:** Wear SCBA.

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**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.

**7 Handling and storage**

- **Handling:**
- **Precautions for safe handling**  
Ensure good ventilation/exhaust at the workplace.  
Prevent formation of aerosols.
- **Information about protection against explosions and fires:**  
Keep ignition sources away - Do not smoke.  
Protect against electrostatic charges.  
Use explosion-proof apparatus / fittings and spark-proof tools.
- **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 oxidizing and acidic materials.  
Do not store together with alkalis (caustic solutions).
- **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 item 7.

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· **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.

<b>Epoxy Compound</b>
TWA Short-term value: 200 mg/m <sup>3</sup>

· **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

## 9 Physical and chemical properties

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

· **General Information**

· **Appearance:**

Form: Liquid

Color: Clear to light yellow

· **Odor:** Characteristic

· **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) (クローズドカップ)

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· <b>Flammability (solid, gaseous):</b>	Not applicable.																									
· <b>Ignition temperature:</b>	430 °C (806 °F)																									
· <b>Decomposition temperature:</b>	Not determined.																									
· <b>Auto igniting:</b>	Product is not selfigniting.																									
· <b>Danger of explosion:</b>	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.																									
· <b>Explosion limits:</b>																										
<b>Lower:</b>	1.3 Vol %																									
<b>Upper:</b>	0.0 Vol %																									
· <b>Vapor pressure at 20 °C (68 °F):</b>	11 hPa (8.3 mm Hg)																									
· <b>Density:</b>	See other information																									
· <b>Relative density</b>	Not determined.																									
· <b>Vapor density</b>	Not determined.																									
· <b>Evaporation rate</b>	1.6-2.3 (BuAc=1)																									
· <b>Solubility in / Miscibility with Water:</b>	Water miscible No																									
· <b>Partition coefficient (n-octanol/water):</b>	Not determined.																									
· <b>Viscosity:</b>																										
<b>Dynamic:</b>	Not determined.																									
<b>Kinematic:</b>	Not determined.																									
· <b>Solvent content:</b>																										
<b>Organic solvents:</b>	15-75 %																									
· <b>Other information</b>	Table 1. Product specific gravity and VOC data.																									
	<table><tr><td>Name</td><td>Number</td><td>Sp. Grav.</td><td>Vol.(%by wt.)</td><td>VOC(g/L)</td></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.	Vol.(%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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### 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** Exothermic polymerization.
- **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  
Corrosive gases/vapors

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Danger of toxic pyrolysis products.

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### 11 Toxicological information

· Information on toxicological effects

· Acute toxicity:

· LD/LC50 values that are relevant for classification:

**Epoxy Resin M2**

Oral	LD50	>2000 mg/kg (Rat)
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**Epoxy Compound**

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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· Primary irritant effect:

· on the skin: Irritant to skin and mucous membranes.

· on the eye: Irritating effect.

· Sensitization: Sensitization possible through skin contact.

· 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 &amp; Health Administration)

None of the ingredients are listed.

### 12 Ecological information

· Toxicity

· Aquatic toxicity:

**Epoxy Compound**

LC50/96 h	55 mg/l (Cyprinus carpio (common carp))
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EC50/48 h	30 mg/l (daphnia magna)
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EC50/72 h	255 mg/l (Desmodesmus subscipatus (green algae))
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**120-92-3 Cyclopentanone**

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

- **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

· <b>UN-Number</b>	
· <b>DOT, ADR, IMDG, IATA</b>	UN1866
· <b>UN proper shipping name</b>	
· <b>DOT</b>	Resin solution
· <b>ADR, IATA</b>	RESIN SOLUTION
· <b>IMDG</b>	RESIN SOLUTION, MARINE POLLUTANT
· <b>Transport hazard class(es)</b>	
· <b>DOT</b>	
	
· <b>Class</b>	3 Flammable liquids
· <b>Label</b>	3

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· ADR, IMDG, IATA



· Class	3 Flammable liquids
· Label	3

· Packing group	III
· DOT, ADR, IMDG, IATA	III

· Environmental hazards:	Product contains environmentally hazardous substances: Formaldehyde, polymer with 1-chloro-2,3-epoxypropane and phenol
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· Marine pollutant:	Yes (DOT)
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· Special precautions for user	Warning: Flammable liquids
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· Hazard identification number (Kemler code):	30
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· EMS Number:	F-E, S-E
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· Stowage Category	A
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· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
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· Transport/Additional information:

· DOT

· Quantity limitations	On passenger aircraft/rail: 60 L On cargo aircraft only: 220 L
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· ADR

· Excepted quantities (EQ)	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
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· 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
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### 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.

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**· 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.

**· 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

**· New Jersey State Right To Know List**

120-92-3 Cyclopentanone

Epoxy Compound

**· Pennsylvania Hazardous Substances List**

120-92-3 Cyclopentanone

Epoxy Compound

**· 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

GHS07

GHS09

**· Signal word** Warning

**· Hazard-determining components of labeling:**

Epoxy Resin M2

**· Hazard statements**

H226 Flammable liquid and vapor.

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/sparks/open flames/hot surfaces. - No smoking.

P261

Avoid breathing dust/fume/gas/mist/vapors/spray

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- P273 Avoid release to the environment.  
 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.

· **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** 12/15/2022

· **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  
 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  
 Sensitization - Skin 1: Skin sensitisation – Category 1  
 Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2