

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

1 Identification

- **Product identifier**
- **Trade name:** PN 1000 Developer
- **Product number:** Y056075
- **Application of the substance / the mixture** Photoresist developer
- **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.



GHS05 Corrosion

Eye Damage 1

H318

Causes serious eye damage.



GHS07

Specific Target Organ Toxicity - Single Exposure 3 H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

- **Label elements**

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

- **Hazard pictograms**



GHS02



GHS05



GHS07

- **Signal word** Danger

(Contd. on page 2)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 1)

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

Ethyl lactate

· **Hazard statements**

H226 Flammable liquid and vapor.

H318 Causes serious eye damage.

H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

· **Precautionary statements**

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

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.

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.

· **Classification system:**

· **NFPA ratings (scale 0 - 4)**



Health = 3

Fire = 2

Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = *3

Fire = 2

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:**

123-42-2	4-hydroxy-4-methylpentan-2-one	60-80%
	⚠ Flammable Liquids 3, H226; ⚠ Eye Irritation 2A, H319	
97-64-3	Ethyl lactate	10-25%
	⚠ Flammable Liquids 3, H226; ⚠ Eye Damage 1, H318; ⚠ Skin Irritation 2, H315; Specific Target Organ Toxicity - Single Exposure 3, H335	

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 2)

4 First-aid measures**· Description of first aid measures****· General information:** Immediately remove any clothing soiled by the product.**· After inhalation:** Supply fresh air; consult doctor in case of complaints.**· After skin contact:** Generally the product does not irritate the skin.**· 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**· 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:

Dilute with plenty of water.

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.

· 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.

US

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 3)

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
 Ensure good ventilation/exhaust at the workplace.
 Prevent formation of aerosols.
 Keep away from heat and direct sunlight.
- **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:** No special requirements.
- **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 section 7.
- **Control parameters**

 · **Components with limit values that require monitoring at the workplace:**
123-42-2 4-hydroxy-4-methylpentan-2-one

PEL	Long-term value: 240 mg/m ³ , 50 ppm
REL	Long-term value: 240 mg/m ³ , 50 ppm
TLV	Long-term value: 238 mg/m ³ , 50 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.
- **Respiratory equipment:**
 In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
- **Protection of hands:**



Protective gloves

(Contd. on page 5)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 4)

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:	Fluid
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:	150 °C (302 °F)

· Flash point: 46 °C (114.8 °F)

· Flammability: Not applicable.

· Auto igniting: 400 °C (752 °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:	1.0 Vol %
Upper:	17.0 Vol %

· Vapor pressure at 20 °C (68 °F): 1.1 hPa (0.8 mm Hg)

· Density at 20 °C (68 °F): 0.9557 g/cm³ (7.97532 lbs/gal)

· Relative density: Not determined.

· Vapor density: Not determined.

· Evaporation rate: 1.6-2.3 (BuAc=1)

· Solubility in / Miscibility with

Water: Fully miscible.

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

· Viscosity:

Dynamic: Not determined.

(Contd. on page 6)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 5)

Kinematic:	Not determined.
Solvent content:	
VOC content:	100
Other information	No further relevant information available.

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

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

LD/LC50 values that are relevant for classification:		
123-42-2 4-hydroxy-4-methylpentan-2-one		
Oral	LD50	2520 mg/kg (Rat)
Dermal	LD50	13500 mg/kg (rab)
Inhalative	LC50/4 h	1500 mg/l (Rat)
97-64-3 Ethyl lactate		
Oral	LD50	8200 mg/kg (Rat)
Dermal	LD50	5000 mg/kg (rabbit)
Inhalative	LC50 8 hr	5.4 mg/l (Rat)

- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** Strong irritant with the danger of severe eye injury.
- **Sensitization:** No sensitizing effects known.
- **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.

(Contd. on page 7)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 6)

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

None of the ingredients are listed.

12 Ecological information

 · **Toxicity**

 · **Aquatic toxicity:**
123-42-2 4-hydroxy-4-methylpentan-2-one

EC50/24 h | 9000 mg/l (daphnia magna)

LC50/96 h | 420 mg/l (Lepomis macrochirus (Bluegill))

97-64-3 Ethyl lactate

LC50/96 h | 320 mg/l (zebra fish)

 · **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.

 · **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

 · **UN-Number**

 · **DOT, ADR, IMDG, IATA**

UN1993

 · **UN proper shipping name**

 · **DOT, ADR**

 · **IMDG**

 · **IATA**

Flammable liquids, n.o.s. (Diacetone alcohol, Ethyl lactate)

FLAMMABLE LIQUID, N.O.S. (DIACETONE ALCOHOL, ETHYL LACTATE)

Flammable liquid, n.o.s. (Diacetone alcohol, Ethyl lactate)

(Contd. on page 8)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 7)

 · **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:** Not applicable.

 · **Special precautions for user** Warning: Flammable liquids

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

 · **EMS Number:** F-E, S-E

 · **Stowage Category** A

 · **Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** Not applicable.

 · **Transport/Additional information:**

 · **DOT**

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

 · **ADR**

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

 · **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 1993 FLAMMABLE LIQUIDS, N.O.S. (DIACETONE ALCOHOL, ETHYL LACTATE), 3, III

US

(Contd. on page 9)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 8)

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.

· 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

123-42-2 4-hydroxy-4-methylpentan-2-one

97-64-3 Ethyl lactate

· New Jersey State Right To Know List

123-42-2 4-hydroxy-4-methylpentan-2-one

97-64-3 Ethyl lactate

· Pennsylvania Hazardous Substances List

123-42-2 4-hydroxy-4-methylpentan-2-one

97-64-3 Ethyl lactate

- 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

(Contd. on page 10)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 9)

· **Signal word** *Danger*

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

Ethyl lactate

· **Hazard statements**

H226 Flammable liquid and vapor.

H318 Causes serious eye damage.

H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

· **Precautionary statements**

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

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.

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 has been updated.*

· **Date of preparation / last revision** *12/13/2024 / 3*

· **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)

VOC: Volatile Organic Compounds (USA, EU)

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

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 12/13/2024

Reviewed on 12/13/2024

Trade name: PN 1000 Developer

(Contd. of page 10)

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

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

US