

Safety Data Sheet

acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

1 Identification

- **Product identifier**
- **Trade name:** MIBK/IPA 1:4 Positive Radiation Resist Developer
- **Product number:** M089020
- **Application of the substance / the mixture** Solvents
- **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

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS07

Eye Irrit. 2A H319 Causes serious eye irritation.

STOT SE 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 GHS07

- **Signal word** Danger
- **Hazard-determining components of labeling:**
 Isopropyl alcohol
 Methyl isobutyl ketone
- **Hazard statements**
 H225 Highly flammable liquid and vapor.
 H319 Causes serious eye irritation.

(Contd. on page 2)

Safety Data Sheet

acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 1)

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)

HMIS-ratings (scale 0 - 4)

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:

67-63-0	Isopropyl alcohol	75-85%
	⚠ Flam. Liq. 2, H225; ⚠ Eye Irrit. 2A, H319; STOT SE 3, H336	
108-10-1	Methyl isobutyl ketone	15-25%
	⚠ Flam. Liq. 2, H225; ⚠ Acute Tox. 4, H332; Eye Irrit. 2A, H319; STOT SE 3, H335	

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 2)

4 First-aid measures**· Description of first aid measures****· General information:**

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

· For safety reasons unsuitable extinguishing agents:

Water with full jet

Water

· 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.

Keep away from ignition sources

Ensure adequate ventilation

· 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.

Dispose contaminated material as waste according to Section 13.

· Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

See Section 13 for disposal information.

(Contd. of page 3)

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
 Ensure good ventilation/exhaust at the workplace.
 Store in cool, dry place in tightly closed containers.
 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:** Store in a cool location.
- **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.
 Store receptacle in a well ventilated area.
 Protect from heat and direct sunlight.
- **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.
- **Control parameters**

 · **Components with limit values that require monitoring at the workplace:**

67-63-0 Isopropyl alcohol

PEL	Long-term value: 980 mg/m ³ , 400 ppm
REL	Short-term value: 1225 mg/m ³ , 500 ppm
	Long-term value: 980 mg/m ³ , 400 ppm
TLV	Short-term value: 984 mg/m ³ , 400 ppm
	Long-term value: 492 mg/m ³ , 200 ppm
BEI	

108-10-1 Methyl isobutyl ketone

PEL	Long-term value: 410 mg/m ³ , 100 ppm
REL	Short-term value: 300 mg/m ³ , 75 ppm
	Long-term value: 205 mg/m ³ , 50 ppm
TLV	Short-term value: 307 mg/m ³ , 75 ppm
	Long-term value: 82 mg/m ³ , 20 ppm
BEI	

(Contd. on page 5)

Safety Data Sheet

acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 4)

Ingredients with biological limit values:
67-63-0 Isopropyl alcohol

BEI 40 mg/L
 Medium: urine
 Time: end of shift at end of workweek
 Parameter: Acetone (background, nonspecific)

108-10-1 Methyl isobutyl ketone

BEI 1 mg/L
 Medium: urine
 Time: end of shift
 Parameter: MIBK

· **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.
 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:	Colorless
Odor:	Like alcohol
Odor threshold:	Not determined.

(Contd. on page 6)

Safety Data Sheet

acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 5)

· pH-value:	Not determined.
· Change in condition	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	82-116 °C (179.6-240.8 °F)
· Flash point:	13 °C (55.4 °F)
· Flammability (solid, gaseous):	Not applicable.
· Ignition temperature:	425 °C (797 °F)
· Decomposition temperature:	Not determined.
· Auto igniting:	Product is not selfigniting.
· Danger of explosion:	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· Explosion limits:	
Lower:	1.7 Vol %
Upper:	12.0 Vol %
· Vapor pressure at 20 °C (68 °F):	43 hPa (32.3 mm Hg)
· Density:	See other information
· Relative density at 20 °C (68 °F)	0.788 g/cm ³ (6.57586 lbs/gal)
· Vapor density	Not determined.
· Evaporation rate	1.6-2.3 (BuAc=1)
· Solubility in / Miscibility with Water:	Partly miscible.
· Partition coefficient (n-octanol/water):	Not determined.
· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
· Solvent content:	
Organic solvents:	100.0 %
VOC content:	100.0 %
· 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** Possible formation of peroxide.
- **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 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

Flammable gases/vapors

(Contd. of page 6)

11 Toxicological information

· Information on toxicological effects

· Acute toxicity:

· LD/LC50 values that are relevant for classification:

67-63-0 Isopropyl alcohol

Oral	LD50	5045 mg/kg (Rat)
Dermal	LD50	12800 mg/kg (rabbit)
Inhalative	LC50/4 h	30 mg/l (Rat)

108-10-1 Methyl isobutyl ketone

Oral	LD50	2080 mg/kg (Rat)
Dermal	LD50	1600 mg/kg (rab)
Inhalative	LC50/4 h	100 mg/l (Rat)

· Primary irritant effect:

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

· on the eye: Irritating effect.

· Sensitization: No sensitizing effects known.

· 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)

67-63-0	Isopropyl alcohol	3
108-10-1	Methyl isobutyl ketone	108-10-1

· NTP (National Toxicology Program)

None of the ingredients are listed.

· OSHA-Ca (Occupational Safety & Health Administration)

None of the ingredients are listed.

12 Ecological information

· Toxicity

· Aquatic toxicity:

67-63-0 Isopropyl alcohol

EC50/48 h	7550-13300 mg/l (daphnia magna) (immobilization)
EC50/72 h	>1000 mg/l (scenedesmus subspicatus) (Growth rate inhibition)
LC50/96 h	9640-10400 mg/l (Pimephales promelas)

108-10-1 Methyl isobutyl ketone

EC50/96 hr	980 mg/l (scenedesmus subspicatus)
	400 mg/l (Selenastrum capricornutum)

(Contd. on page 8)

Safety Data Sheet

acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 7)


LC50/24 h	5000 mg/l (daphnia magna)
	460 mg/l (goldfish)
LC50/96 h	505 mg/l (fathead minnow)
	505-540 mg/l (Pimephales promelas)
	600 mg/l (Salmo gairdneri)

- **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	UN1993
· UN proper shipping name	
· DOT, ADR, IMDG, IATA	FLAMMABLE LIQUID, N.O.S. (ISOPROPYL ALCOHOL, METHYL ISOBUTYL KETONE)
· Transport hazard class(es)	
· DOT	
	
· Class	3 Flammable liquids

(Contd. on page 9)

Safety Data Sheet


acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 8)

· Label	3
· ADR, IMDG, IATA	
	
· Class	3 Flammable liquids
· Label	3
· Packing group	
· DOT, ADR, IMDG, IATA	II
· 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":	UN1993, FLAMMABLE LIQUID, N.O.S. (ISOPROPANOL (ISOPROPYL ALCOHOL), METHYL ISOBUTYL KETONE), 3, II

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):**

All ingredients are listed.

 · **TSCA (Toxic Substances Control Act):** All ingredients are listed or comply with TSCA regulations.

 · **Proposition 65**

 · **Chemicals known to cause cancer:**

108-10-1 Methyl isobutyl ketone

 · **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)**

108-10-1 Methyl isobutyl ketone

I

(Contd. on page 10)

Safety Data Sheet

acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 9)

· TLV (Threshold Limit Value)		
67-63-0	Isopropyl alcohol	A4
· NIOSH-Ca (National Institute for Occupational Safety and Health)		
None of the ingredients are listed.		
· Massachusetts State Right To Know List		
67-63-0	Isopropyl alcohol	
108-10-1	Methyl isobutyl ketone	
· New Jersey State Right To Know List		
67-63-0	Isopropyl alcohol	
108-10-1	Methyl isobutyl ketone	
· Pennsylvania Hazardous Substances List		
67-63-0	Isopropyl alcohol	
108-10-1	Methyl isobutyl ketone	

- **California SCAQMD Rule 443.1 VOC's:** 788 g/l
- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS02 GHS07

- **Signal word** Danger
- **Hazard-determining components of labeling:**
 Isopropyl alcohol
 Methyl isobutyl ketone
- **Hazard statements**
 H225 Highly flammable liquid and vapor.
 H319 Causes serious eye irritation.
 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.

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 02/03/2022

Reviewed on 02/03/2022

Trade name: MIBK/IPA 1:4 Positive Radiation Resist Developer

(Contd. of page 10)

· **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** 02/03/2022 / 5· **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)

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

REL: Recommended Exposure Limit

BEI: Biological Exposure Limit

Flam. Liq. 2: Flammable liquids – Category 2

Acute Tox. 4: Acute toxicity – Category 4

Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A

STOT SE 3: Specific target organ toxicity (single exposure) – Category 3