

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

1 Identification

- **Product identifier**
- **Trade name:** PMGI SF Slow Series Resists
- **Product number:**
 G213102, G213103, G213104, G213105, G213106, G213107, G213108, G213109, G213111, G213113, G213115, G213119
- **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.



GHS08 Health hazard

Toxic to Reproduction 1B H360 May damage fertility or the unborn child.



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



GHS08

(Contd. on page 2)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 1)

· **Signal word** *Danger*

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

Tetrahydrofurfuryl alcohol

· **Hazard statements**

H226 Flammable liquid and vapor.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H360 May damage fertility or the unborn child.

· **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.

P332+P313 If skin irritation 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 = 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	65-85%
	Flammable Liquids 3, H226; Skin Irritation 2, H315; Eye Irritation 2A, H319	

(Contd. on page 3)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 2)

97-99-4	Tetrahydrofurfuryl alcohol	1-15%
	☠ Toxic to Reproduction 1B, H360; ⚠ Eye Irritation 2A, H319	
102322-80-5	Polyaliphatic imide copolymer	1-25%
	⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319	

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.

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow 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.

· **Protective Action Criteria for Chemicals**

· **PAC-1:**

120-92-3	Cyclopentanone	0.87 ppm
----------	----------------	----------

· **PAC-2:**

120-92-3	Cyclopentanone	9.5 ppm
----------	----------------	---------

· **PAC-3:**

120-92-3	Cyclopentanone	57 ppm
----------	----------------	--------

7 Handling and storage

· **Handling:**

· **Precautions for safe handling**

Ensure good ventilation/exhaust at the workplace.

Keep receptacles tightly sealed.

Use only under yellow light

Prevent formation of aerosols.

· **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.

Store in inert atmosphere or keep well sealed to prevent the formation of peroxides and other oxidation products.

· **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.

(Contd. on page 5)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 4)

· Control parameters

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

97-99-4 Tetrahydrofurfuryl alcohol
WEEL 0.5 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.

Do not inhale gases / fumes / aerosols.

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

Contact glove manufacturer for break-through time.

 · **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:**

Slightly sweet

 · **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)

 · **Flammability (solid, gaseous):**

Not applicable.

(Contd. on page 6)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 5)

· Auto igniting:	280 °C (536 °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:	1.5 Vol %																																																																	
Upper:	9.7 Vol %																																																																	
· Vapor pressure at 20 °C (68 °F):	0.3 hPa (0.2 mm Hg)																																																																	
· Density:	Not determined.																																																																	
· Relative density	See Other information																																																																	
· Vapor density	Not determined.																																																																	
· Evaporation rate	Not determined.																																																																	
· Solubility in / Miscibility with Water:	Partly miscible.																																																																	
· Partition coefficient (n-octanol/water):	Not determined.																																																																	
· Viscosity:																																																																		
Dynamic:	Not determined.																																																																	
Kinematic:	Not determined.																																																																	
· Solvent content:																																																																		
VOC content:	65-85																																																																	
· Other information	<table><tr><td><i>Name</i></td><td><i>Number</i></td><td><i>Sp. Grav.</i></td><td><i>Vol.(%by wt.)</i></td><td><i>VOC(g/L)</i></td></tr><tr><td>SF2S</td><td>G213102</td><td>0.966</td><td>83</td><td>805</td></tr><tr><td>SF3S</td><td>G213103</td><td>0.968</td><td>83</td><td>800</td></tr><tr><td>SF4S</td><td>G213104</td><td>0.971</td><td>82</td><td>790</td></tr><tr><td>SF5S</td><td>G213105</td><td>0.973</td><td>81</td><td>785</td></tr><tr><td>SF6S</td><td>G213106</td><td>0.977</td><td>80</td><td>780</td></tr><tr><td>SF7S</td><td>G213107</td><td>0.979</td><td>79</td><td>775</td></tr><tr><td>SF8S</td><td>G213108</td><td>0.983</td><td>78</td><td>765</td></tr><tr><td>SF9S</td><td>G213109</td><td>0.984</td><td>78</td><td>760</td></tr><tr><td>SF11S</td><td>G213111</td><td>0.992</td><td>75</td><td>750</td></tr><tr><td>SF13S</td><td>G213113</td><td>0.998</td><td>73</td><td>730</td></tr><tr><td>SF15S</td><td>G213115</td><td>1.004</td><td>72</td><td>720</td></tr><tr><td>SF 19S</td><td>G213119</td><td>1.015</td><td>69</td><td>700</td></tr></table>	<i>Name</i>	<i>Number</i>	<i>Sp. Grav.</i>	<i>Vol.(%by wt.)</i>	<i>VOC(g/L)</i>	SF2S	G213102	0.966	83	805	SF3S	G213103	0.968	83	800	SF4S	G213104	0.971	82	790	SF5S	G213105	0.973	81	785	SF6S	G213106	0.977	80	780	SF7S	G213107	0.979	79	775	SF8S	G213108	0.983	78	765	SF9S	G213109	0.984	78	760	SF11S	G213111	0.992	75	750	SF13S	G213113	0.998	73	730	SF15S	G213115	1.004	72	720	SF 19S	G213119	1.015	69	700
<i>Name</i>	<i>Number</i>	<i>Sp. Grav.</i>	<i>Vol.(%by wt.)</i>	<i>VOC(g/L)</i>																																																														
SF2S	G213102	0.966	83	805																																																														
SF3S	G213103	0.968	83	800																																																														
SF4S	G213104	0.971	82	790																																																														
SF5S	G213105	0.973	81	785																																																														
SF6S	G213106	0.977	80	780																																																														
SF7S	G213107	0.979	79	775																																																														
SF8S	G213108	0.983	78	765																																																														
SF9S	G213109	0.984	78	760																																																														
SF11S	G213111	0.992	75	750																																																														
SF13S	G213113	0.998	73	730																																																														
SF15S	G213115	1.004	72	720																																																														
SF 19S	G213119	1.015	69	700																																																														

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**
 Contact with incompatible materials.
 Heat, flames and sparks. Extremes of temperature and direct sunlight.

(Contd. on page 7)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 6)

- **Incompatible materials:** Strong Oxidizing Agents, Strong Bases, Strong Acids, Amines
- **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:**

97-99-4 Tetrahydrofurfuryl alcohol

Oral	LD50	800 mg/kg (Guinea pig) 2300 mg/kg (mouse) 1600 mg/kg (Rat)
Dermal	LD50	5000 mg/kg (Guinea pig)

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)

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:** 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.

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

None of the ingredients are listed.

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)

(Contd. on page 8)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists



(Contd. of page 7)

- **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 | UN1866 |
| · UN proper shipping name
· DOT, IMDG, IATA
· ADR | RESIN SOLUTION
1866 RESIN SOLUTION |
| · Transport hazard class(es)
· DOT | |
|  | |
| · Class
· Label | 3 Flammable liquids
3 |
| · ADR, IMDG, IATA | |
|  | |
| · Class
· Label | 3 Flammable liquids
3 |

(Contd. on page 9)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 8)

· 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.

- **Hazardous Air Pollutants**

None of the ingredients are listed.

- **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

(Contd. on page 10)

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 9)

97-99-4	Tetrahydrofurfuryl alcohol
· New Jersey State Right To Know List	
120-92-3	Cyclopentanone
· Pennsylvania Hazardous Substances List	
120-92-3	Cyclopentanone
97-99-4	Tetrahydrofurfuryl alcohol

- **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**



- **Signal word** *Danger*
- **Hazard-determining components of labeling:**
Tetrahydrofurfuryl alcohol
- **Hazard statements**
 H226 Flammable liquid and vapor.
 H315 Causes skin irritation.
 H319 Causes serious eye irritation.
 H360 May damage fertility or the unborn child.
- **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.
 P332+P313 If skin irritation 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)

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 04/14/2023

Reviewed on 04/14/2023

Trade name: PMGI SF Slow Series Resists

(Contd. of page 10)

· 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 04/14/2023**· 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)

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

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

Toxic to Reproduction 1B: Reproductive toxicity – Category 1B

US