Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.04.2023 *Version number 6* *Revision: 14.04.2023*

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

· **1.1 Product identifier**

· **Trade name: PMGI SF Slow Series Resists**

· **Article number:**
G213102, G213103, G213104, G213105, G213106, G213107, G213108, G213109, G213111, G213113, G213115, G213119

· **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:**
Manufacturer:
Kayaku Advanced Materials
200 Flanders Road
Westborough, MA 01581
Telephone: (617) 965-5511
Fax: (617) 965-5818

Importer:
A-Gas Electronic Materials
Unit 3, IO Centre
Swift Valley
Rugby, Warwickshire
CV21 1TW, UK
Tel: +44-0-1788-537535
Fax: +44-0-1788-535835
Website: www.agasem.com
Email: customerservice.em@agas.com

· **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**


flame

Flam. Liq. 3 H226 Flammable liquid and vapour.


health hazard

Repr. 1B H360 May damage fertility or the unborn child.

(Contd. on page 2)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.04.2023 *Version number 6* *Revision: 14.04.2023*

Trade name: PMGI SF Slow Series Resists

(Contd. of page 1)

Skin Irrit. 2 H315 Causes skin irritation.
Eye Irrit. 2 H319 Causes serious eye irritation.

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

GHS02 GHS07 GHS08

· ***Signal word*** *Danger*

· ***Hazard-determining components of labelling:***
Tetrahydrofurfuryl alcohol
· ***Hazard statements***
H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H360 May damage fertility or the unborn child.
· ***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.*
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 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.*
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.*

· ***Additional information:***
Restricted to professional users.
· ***2.3 Other hazards***
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.

(Contd. on page 3)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.04.2023 *Version number 6* *Revision: 14.04.2023*

Trade name: PMGI SF Slow Series Resists

(Contd. of page 2)

· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Chemical characterisation: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**		
CAS: 120-92-3 EINECS: 204-435-9	Cyclopentanone Flam. Liq. 3, H226; Skin Irrit. 2, H315; Eye Irrit. 2, H319	65-85%
CAS: 97-99-4 EINECS: 202-625-6	Tetrahydrofurfuryl alcohol Repr. 1B, H360; Eye Irrit. 2, H319	1-15%

· **Additional Components:**			
102322-80-5	Polyaliphatic imide copolymer	Skin Irrit. 2, H315; Eye Irrit. 2, H319	1-25%

· **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.
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:** 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
Carbon dioxide
· **For safety reasons unsuitable extinguishing agents:**
Water with full jet
Water
· **5.2 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.

(Contd. on page 4)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.04.2023 *Version number 6* *Revision: 14.04.2023*

Trade name: PMGI SF Slow Series Resists

(Contd. of page 3)

· ***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.
Keep receptacles tightly sealed.
Use only under yellow light
Prevent formation of aerosols.
· ***Information about fire - and explosion protection:***
Keep ignition sources away - Do not smoke.
Use explosion-proof apparatus / fittings and spark-proof tools.
Protect against electrostatic charges.

· ***7.2 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 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***
· ***Additional information about design of technical facilities:*** *No further data; see section 7.*

(Contd. on page 5)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.04.2023 *Version number 6* *Revision: 14.04.2023*

Trade name: PMGI SF Slow Series Resists

(Contd. of page 4)

· ***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.
· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 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 protection:***
In case of low exposure use cartridge respirator. In case of intensive or longer exposure use self-contained respiratory protective device.
· ***Protection of hands:***

Protective gloves

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· ***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 protection:***

Tightly sealed goggles

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***	
· ***General Information***	
· ***Appearance:***	
Form:	*Liquid*
Colour:	*Clear to light yellow*
· ***Odour:***	*Slightly sweet*
· ***Odour threshold:***	*Not determined.*
· ***pH-value:***	*Not determined.*
· ***Change in condition***	
Melting point/freezing point:	*Undetermined.*
Initial boiling point and boiling range:	*130 °C*
· ***Flash point:***	*30 °C*
· ***Flammability (solid, gas):***	*Not applicable.*

(Contd. on page 6)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.04.2023 *Version number 6* *Revision: 14.04.2023*

Trade name: PMGI SF Slow Series Resists

(Contd. of page 5)

· **Auto-ignition temperature:**	280 °C
· **Decomposition temperature:**	Not determined.
· **Ignition temperature:**	Product is not selfigniting.
· **Explosive properties:**	Product is not explosive. However, formation of explosive air/vapour mixtures are possible.
· **Explosion limits:**	
Lower:	1.5 Vol %
Upper:	9.7 Vol %
· **Vapour pressure at 20 °C:**	0.3 hPa
· **Density:**	Not determined
· **Relative density**	See Other information
· **Vapour 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.

· **9.2 Other information**

Name	Number	Sp. Grav.	Vol.(%by wt.)	VOC(g/L)
SF2S	G213102	0.968	98	950
SF3S	G213103	0.970	97	945
SF4S	G213104	0.973	96	935
SF5S	G213105	0.975	95	930
SF6S	G213106	0.980	94	920
SF7S	G213107	0.981	93	915
SF8S	G213108	0.984	92	905
SF9S	G213109	0.985	91	900
SF11S	G213111	0.992	89	880
SF13S	G213113	0.998	87	860
SF15S	G213115	1.003	85	850
SF 19S	G213119	1.010	81	800

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** No dangerous reactions known.
· **10.4 Conditions to avoid**
Contact with incompatible materials.
Heat, flames and sparks. Extremes of temperature and direct sunlight.
· **10.5 Incompatible materials:** Strong Oxidizing Agents, Strong Bases, Strong Acids, Amines

(Contd. on page 7)

(Contd. of page 6)

· **10.6 Hazardous decomposition products:** Carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity** Based on available data, the classification criteria are not met.

· **LD/LC50 values 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:**
· **Skin corrosion/irritation**
Causes skin irritation.
· **Serious eye damage/irritation**
Causes serious eye irritation.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **Additional toxicological information:**
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **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**
May damage fertility or the unborn child.
· **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.

SECTION 12: Ecological information

· **12.1 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)

· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.

(Contd. on page 8)

(Contd. of page 7)

· **12.4 Mobility in soil** No further relevant information available.
· **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.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

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.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN1866
· **14.2 UN proper shipping name**	
· **ADR**	1866 RESIN SOLUTION
· **IMDG, IATA**	RESIN SOLUTION
· **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:**	
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Warning: Flammable liquids.
· **Hazard identification number (Kemler code):**	33
· **EMS Number:**	F-E,S-E
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.

(Contd. on page 9)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 14.04.2023 *Version number 6* *Revision: 14.04.2023*

Trade name: PMGI SF Slow Series Resists

(Contd. of page 8)

· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	5L
· **Transport category**	3
· **Tunnel restriction code**	D/E
· **UN "Model Regulation":**	UN1866, RESIN SOLUTION, 3, III

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.
· **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.
H319 Causes serious eye irritation.
H360 May damage fertility or the unborn child.

· **Department issuing SDS:** Product safety department
· **Contact:** Tom Cole, EHS Manager (tcole@kayakuam.com)
· **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
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
Eye Irrit. 2: Serious eye damage/eye irritation – Category 2
Repr. 1B: Reproductive toxicity – Category 1B