

Safety data sheet

according to Regulation (EC) No 1907/2006, Article 31

Printing date 01.11.2024

Version number 6 (replaces version 5)

Revision: 01.11.2024

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

- **1.1 Product identifier**
- **Trade name:** 495 PMMA Series Resists in Chlorobenzene
- **Article number:**
M140001, M140002, M140003, M140004, M140005, M140006, M140007, M140507, M140008, M140009, M140010, M140011, M140012
- **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:**
Kayaku Advanced Materials, Inc.
200 Flanders Road
Westborough, MA 01581
Tel: (617) 965-5511
Fax: (617) 965-5818
- **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**



GHS02 flame

Flam. Liq. 3 H226 Flammable liquid and vapour.



GHS08 health hazard

STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.



GHS09 environment

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



GHS07

Acute Tox. 4 H302 Harmful if swallowed.

Acute Tox. 4 H332 Harmful if inhaled.

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Skin Irrit. 2 H315 Causes skin irritation.
 STOT SE 3 H336 May cause drowsiness or dizziness.

· 2.2 Label elements

· Labelling according to Regulation (EC) No 1272/2008

The product is classified and labelled according to the CLP regulation.

· Hazard pictograms



GHS02 GHS07 GHS08 GHS09

· Signal word Danger

· Hazard-determining components of labelling:

Chlorobenzene

· Hazard statements

H226 Flammable liquid and vapour.
 H302+H332 Harmful if swallowed or if inhaled.
 H315 Causes skin irritation.
 H336 May cause drowsiness or dizziness.
 H372 Causes damage to organs through prolonged or repeated exposure.
 H411 Toxic to aquatic life with long lasting effects.

· 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.
 P273 Avoid release to the environment.
 P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
 P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
 P302+P352 IF ON SKIN: Wash with plenty of soap and water.
 P304+P340 IF INHALED: 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 alcohol resistant foam to extinguish.
 P370+P378 In case of fire: Use fire-extinguishing powder to extinguish.
 P370+P378 In case of fire: Use carbon dioxide to extinguish.
 P403+P235 Store in a well-ventilated place. Keep cool.
 P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· 2.3 Other hazards

· Results of PBT and vPvB assessment

· **PBT:** Not applicable.

· **vPvB:** Not applicable.

· Determination of endocrine-disrupting properties

108-90-7	Chlorobenzene	List II
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SECTION 3: Composition/information on ingredients

· 3.2 Mixtures

· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 108-90-7 EINECS: 203-628-5 Index number: 602-033-00-1	Chlorobenzene ⚠ Flam. Liq. 3, H226; ⚠ STOT RE 1, H372; ⚠ Aquatic Chronic 2, H411; ⚠ Acute Tox. 4, H302; Acute Tox. 4, H332; Skin Irrit. 2, H315; STOT SE 3, H336	85-100%
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· **Additional Components:**

CAS: 9011-14-7 EC number: 618-466-4	Poly(methyl methacrylate)	1-15%
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· **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:**

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

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; call for medical help immediately.

· **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

· 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.

In case of fire, the following can be released:

Hydrogen chloride (HCl)

Phosgene gas

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- **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.
Keep away from ignition sources.
Ensure adequate ventilation
- **6.2 Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow product to reach sewage system or any water course.
- **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.
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:** No special requirements.
- **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.
Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting.
Protect from heat and direct sunlight.
Store receptacle in a well ventilated area.
- **7.3 Specific end use(s)** No further relevant information available.

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SECTION 8: Exposure controls/personal protection

· 8.1 Control parameters

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

108-90-7 Chlorobenzene

IOELV	Short-term value: 70 mg/m ³ , 15 ppm
	Long-term value: 23 mg/m ³ , 5 ppm

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

· 8.2 Exposure controls

· **Appropriate engineering controls** No further data; see section 7.

· **Individual protection measures, such as personal protective equipment**

· **General protective and hygienic measures:**

Keep away from food and beverages.

Immediately remove all soiled and contaminated clothing

Do not inhale gases / fumes / aerosols.

Avoid contact with the eyes and skin.

Wash hands before breaks and at the end of work.

· **Respiratory protection:**

In case of low exposure use cartridge respirator. In case of intensive or longer exposure use self-contained respiratory protective device.

· **Hand protection**



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**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **Eye/face protection**



Tightly sealed goggles

· **Body protection:** Long-sleeved work clothes

SECTION 9: Physical and chemical properties

· 9.1 Information on basic physical and chemical properties

· General Information

· **Physical state**

Liquid

· **Colour:**

Clear

· **Odour:**

Mild

· **Odour threshold:**

Not determined.

· **Melting point/freezing point:**

Undetermined.

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· Boiling point or initial boiling point and boiling range	132 °C
· Flammability	Not applicable.
· Lower and upper explosion limit	
· Lower:	1.3 Vol %
· Upper:	11.0 Vol %
· Flash point:	28 °C (クロースドカップ)
· Auto-ignition temperature:	590 °C
· Decomposition temperature:	Not determined.
· pH	Not determined.
· Viscosity:	
· Kinematic viscosity	Not determined.
· Dynamic:	Not determined.
· Solubility	
· water:	Not miscible or difficult to mix.
· Partition coefficient n-octanol/water (log value)	Not determined.
· Vapour pressure at 20 °C:	12 hPa
· Density and/or relative density	
· Density:	Not determined
· Relative density	See Table 1 Other Information
· Vapour density	Not determined.

· 9.2 Other information	Name	Number	Sp.Grav.	VOC(%by wt.)	VOC (g/L)
	495C1	M140001	1.105	99	1095
	495C2	M140002	1.107	98	1085
	495C3	M140003	1.109	97	1075
	495C4	M140004	1.110	96	1065
	495C5	M140005	1.110	95	1055
	495C6	M140006	1.111	94	1045
	495C7	M140007	1.113	93	1035
	495C7.5	M140507	1.113	92.5	1030
	495C8	M140008	1.114	92	1025
	495C9	M140009	1.115	91	1015
	495C10	M140010	1.116	90	1005
	495C11	M140011	1.117	89	995
	495C12	M140012	1.118	88	985

· Appearance:	
· Form:	Liquid
· Important information on protection of health and environment, and on safety.	
· Ignition temperature:	Product is not selfigniting.
· Explosive properties:	Product is not explosive. However, formation of explosive air/vapour mixtures are possible.
· Change in condition	
· Evaporation rate	Not determined.

· Information with regard to physical hazard classes	
· Explosives	Not applicable.
· Flammable gases	Not applicable.
· Aerosols	Not applicable.

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· Oxidising gases	Not applicable.
· Gases under pressure	Not applicable.
· Flammable liquids	Flammable liquid and vapour.
· Flammable solids	Not applicable.
· Self-reactive substances and mixtures	Not applicable.
· Pyrophoric liquids	Not applicable.
· Pyrophoric solids	Not applicable.
· Self-heating substances and mixtures	Not applicable.
· Substances and mixtures, which emit flammable gases in contact with water	Not applicable.
· Oxidising liquids	Not applicable.
· Oxidising solids	Not applicable.
· Organic peroxides	Not applicable.
· Corrosive to metals	Not applicable.
· Desensitised explosives	Not applicable.

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**
Heat, flames and sparks. Extremes of temperature and direct sunlight.
Contact with incompatible materials.
- **10.5 Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Hydrogen chloride (HCl)
Possible traces of Phosgene

SECTION 11: Toxicological information

- **11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008**
- **Acute toxicity**
Harmful if swallowed or if inhaled.

· **LD/LC50 values relevant for classification:**

108-90-7 Chlorobenzene

Oral	LD50	1110 mg/kg (Rat)
Dermal	LD50	>7940 mg/kg (rabbit)
Inhalative	LC50	13.9 mg/L (Rat)

- **Primary irritant effect:**
- **Skin corrosion/irritation**
Causes skin irritation.
- **Serious eye damage/irritation** Based on available data, the classification criteria are not met.
- **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
- **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
- **Carcinogenicity** Based on available data, the classification criteria are not met.

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- **Reproductive toxicity** Based on available data, the classification criteria are not met.
- **STOT-single exposure**
May cause drowsiness or dizziness.
- **STOT-repeated exposure**
Causes damage to organs through prolonged or repeated exposure.
- **Aspiration hazard** Based on available data, the classification criteria are not met.
- **11.2 Information on other hazards**

· Endocrine disrupting properties	
108-90-7	Chlorobenzene

List II

SECTION 12: Ecological information

 · **12.1 Toxicity**

· Aquatic toxicity:								
108-90-7 Chlorobenzene								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">EC50/24 h</td> <td style="padding: 2px;">4.30-16.00 mg/l (daphnia magna)</td> </tr> <tr> <td style="padding: 2px;">EC50/96 hr</td> <td style="padding: 2px;">12.5 mg/l (algae)</td> </tr> <tr> <td style="padding: 2px;">LC100/48 h</td> <td style="padding: 2px;">0.03-28 mg/l (golden orfe)</td> </tr> <tr> <td style="padding: 2px;">LC50/76 h</td> <td style="padding: 2px;">4.5-7.4 mg/l (Lepomis macrochirus (Bluegill))</td> </tr> </table>	EC50/24 h	4.30-16.00 mg/l (daphnia magna)	EC50/96 hr	12.5 mg/l (algae)	LC100/48 h	0.03-28 mg/l (golden orfe)	LC50/76 h	4.5-7.4 mg/l (Lepomis macrochirus (Bluegill))
EC50/24 h	4.30-16.00 mg/l (daphnia magna)							
EC50/96 hr	12.5 mg/l (algae)							
LC100/48 h	0.03-28 mg/l (golden orfe)							
LC50/76 h	4.5-7.4 mg/l (Lepomis macrochirus (Bluegill))							

 · **12.2 Persistence and degradability** Expected to biodegrade

 · **12.3 Bioaccumulative potential** Not expected to bioaccumulate.

 · **12.4 Mobility in soil** No further relevant information available.

 · **12.5 Results of PBT and vPvB assessment**

 · **PBT:** Not applicable.

 · **vPvB:** Not applicable.

 · **12.6 Endocrine disrupting properties** For information on endocrine disrupting properties see section 11.

 · **12.7 Other adverse effects** No further relevant information available.

 · **Remark:** Toxic for fish

 · **Additional ecological information:**

 · **General notes:**

Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Toxic for aquatic organisms

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.

Disposal must be made in accordance with International, National, and regional regulations.

 · **Uncleaned packaging:**

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

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SECTION 14: Transport information

· 14.1 UN number or ID number · ADR, IMDG, IATA	UN1866
· 14.2 UN proper shipping name · ADR, IATA · IMDG	RESIN SOLUTION RESIN SOLUTION (CHLOROBENZENE), MARINE POLLUTANT
· 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:	Product contains environmentally hazardous substances: Chlorobenzene Yes
· 14.6 Special precautions for user · Hazard identification number (Kemler code): · EMS Number: · Segregation groups	Warning: Flammable liquids. 30 F-E,S-D Liquid halogenated hydrocarbons
· 14.7 Maritime transport in bulk according to IMO instruments	Not applicable.
· Transport/Additional information:	
· ADR · Limited quantities (LQ) · Transport category · Tunnel restriction code	5L 3 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
· Directive 2012/18/EU
· Qualifying quantity (tonnes) for the application of lower-tier requirements 200 t
· Qualifying quantity (tonnes) for the application of upper-tier requirements 500 t
· REGULATION (EC) No 1907/2006 ANNEX XVII Conditions of restriction: 3
· DIRECTIVE 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment – Annex II
None of the ingredients is listed.

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· **REGULATION (EU) 2019/1148**

· **Annex I - RESTRICTED EXPLOSIVES PRECURSORS (Upper limit value for the purpose of licensing under Article 5(3))**

None of the ingredients is listed.

· **Annex II - REPORTABLE EXPLOSIVES PRECURSORS**

None of the ingredients is listed.

· **Regulation (EC) No 273/2004 on drug precursors**

None of the ingredients is listed.

· **Regulation (EC) No 111/2005 laying down rules for the monitoring of trade between the Community and third countries in drug precursors**

None of the ingredients is listed.

· **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.

H302 Harmful if swallowed.

H315 Causes skin irritation.

H332 Harmful if inhaled.

H336 May cause drowsiness or dizziness.

H372 Causes damage to organs through prolonged or repeated exposure.

H411 Toxic to aquatic life with long lasting effects.

· **Classification according to Regulation (EC) No 1272/2008**

Art. 9(1) of Regulation (EC) No. 1272/2008 was used for classification purposes.

· **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.

· **Version number of previous version:** 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

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

Acute Tox. 4: Acute toxicity – Category 4

Skin Irrit. 2: Skin corrosion/irritation – Category 2

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