

1 Identification

· **Product identifier**

· **Trade name:** 495 PMMA Series Resists in Chlorobenzene

· **Product number:**

M140001, M140002, M140003, M140004, M140005, M140006, M140007, M140507, M140008, M140009, M140010, M140011, M140012

· **Application of the substance / the mixture** Photoresist

· **Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**

Kayaku Advanced Materials
 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. 3 H226 Flammable liquid and vapor.



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.

Skin Irrit. 2 H315 Causes skin irritation.

STOT SE 3 H336 May cause drowsiness or dizziness.

· **Label elements**

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

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 · **Hazard pictograms**


GHS02 GHS07 GHS08 GHS09

 · **Signal word** *Danger*

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

Chlorobenzene

 · **Hazard statements**

- H226 Flammable liquid and vapor.
 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/sparks/open flames/hot surfaces. - No smoking.
 P261 Avoid breathing dust/fume/gas/mist/vapors/spray
 P273 Avoid release to the environment.
 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+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 for extinction: Alcohol resistant foam.
 P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
 P370+P378 In case of fire: Use for extinction: 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 = 1
 Fire = 3
 Reactivity = 0

 · **HMIS-ratings (scale 0 - 4)**

 Health = 1
 Fire = 3
 Reactivity = 0

 · **Other hazards**

 · **Results of PBT and vPvB assessment**

 · **PBT:** Not applicable.

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

 · **vPvB:** Not applicable.

3 Composition/information on ingredients

 · **Chemical characterization:** Mixtures

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

 · **Dangerous components:**

108-90-7	Chlorobenzene	85-100%
	 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	

 · **Additional Components:**

9011-14-7	Poly(methyl methacrylate)	1-15%
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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.

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; immediately call for medical help.

 · **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.

In case of fire, the following can be released:

Hydrogen chloride (HCl)

Phosgene gas

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- **Advice for firefighters**
- **Protective equipment:** Wear SCBA.

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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:**
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow product to reach sewage system or any drains.
- **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.

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaust at the workplace.
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:** 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.
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.
- **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.

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 · **Control parameters**

 · **Components with limit values that require monitoring at the workplace:**
108-90-7 Chlorobenzene

PEL ()	350 mg/m ³ , 75 ppm
TLV ()	46 mg/m ³ , 10 ppm
	BEI

 · **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.

Do not inhale gases / fumes / aerosols.

Avoid contact with the eyes and skin.

Wash hands before breaks and at the end of work.

 · **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: Clear

 · **Odor:** Mild

 · **Odor threshold:** Not determined.

 · **pH-value:** Not determined.

 · **Change in condition**

Melting point/Melting range: Undetermined.

Boiling point/Boiling range: 132 °C (269.6 °F)

 · **Flash point:** 28 °C (82.4 °F)

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· Flammability (solid, gaseous):	Not applicable.																																																																						
· Ignition temperature:	590 °C (1,094 °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:	1.3 Vol %																																																																						
Upper:	11.0 Vol %																																																																						
· Vapor pressure at 20 °C (68 °F):	12 hPa (9 mm Hg)																																																																						
· Density:	Not determined.																																																																						
· Relative density	See Table 1 Other Information																																																																						
· Vapor density	Not determined.																																																																						
· Evaporation rate	Not determined.																																																																						
· Solubility in / Miscibility with Water:	Water miscible No																																																																						
· Partition coefficient (n-octanol/water):	Not determined.																																																																						
· Viscosity:																																																																							
Dynamic:	Not determined.																																																																						
Kinematic:	Not determined.																																																																						
· Other information	Table 1. Product specific gravity and VOC data.																																																																						
	<table><tr><td>Name</td><td>Number</td><td>Sp.Grav.</td><td>Vol.(%by wt.)</td><td>VOC (g/L)</td></tr><tr><td>495C1</td><td>M140001</td><td>1.105</td><td>99</td><td>1095</td></tr><tr><td>495C2</td><td>M140002</td><td>1.107</td><td>98</td><td>1085</td></tr><tr><td>495C3</td><td>M140003</td><td>1.109</td><td>97</td><td>1075</td></tr><tr><td>495C4</td><td>M140004</td><td>1.110</td><td>96</td><td>1065</td></tr><tr><td>495C5</td><td>M140005</td><td>1.110</td><td>95</td><td>1055</td></tr><tr><td>495C6</td><td>M140006</td><td>1.111</td><td>94</td><td>1045</td></tr><tr><td>495C7</td><td>M140007</td><td>1.113</td><td>93</td><td>1035</td></tr><tr><td>495C7.5</td><td>M140507</td><td>1.113</td><td>92.5</td><td>1030</td></tr><tr><td>495C8</td><td>M140008</td><td>1.114</td><td>92</td><td>1025</td></tr><tr><td>495C9</td><td>M140009</td><td>1.115</td><td>91</td><td>1015</td></tr><tr><td>495C10</td><td>M140010</td><td>1.116</td><td>90</td><td>1005</td></tr><tr><td>495C11</td><td>M140011</td><td>1.117</td><td>89</td><td>995</td></tr><tr><td>495C12</td><td>M140012</td><td>1.118</td><td>88</td><td>985</td></tr></table>	Name	Number	Sp.Grav.	Vol.(%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
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10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
Stable under normal use conditions
Stable
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.

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- **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
Hydrogen chloride (HCl)
Possible traces of Phosgene

11 Toxicological information

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

 · **LD/LC50 values that are 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:**
- **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:
Harmful

- **Carcinogenic categories**

 · **IARC (International Agency for Research on Cancer)**

9011-14-7 Poly(methyl methacrylate)

3

 · **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:**
108-90-7 Chlorobenzene

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))

- **Persistence and degradability** Expected to biodegrade
- **Behavior in environmental systems:**
- **Bioaccumulative potential** Not expected to bioaccumulate.
- **Mobility in soil** No further relevant information available.

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- **Ecotoxicological effects:**
- **Remark:** Toxic for fish
- **Additional ecological information:**
- **General notes:**
 Water hazard class 2 (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
- **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, ADR | Resin solution |
| · IMDG | RESIN SOLUTION (CHLOROBENZENE), MARINE POLLUTANT |
| · IATA | RESIN SOLUTION |
| · Transport hazard class(es) | |
| · DOT | |
| |  |
| · Class | 3 Flammable liquids |
| · Label | 3 |
| · ADR, IMDG, IATA | |
| |  |
| · Class | 3 Flammable liquids |
| · Label | 3 |

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· Packing group	III
· DOT, ADR, IMDG, IATA	
· Environmental hazards:	Product contains environmentally hazardous substances: Chlorobenzene
· Marine pollutant:	Yes
· Special precautions for user	Warning: Flammable liquids
· Danger code (Kemler):	30
· EMS Number:	F-E,S-D
· Segregation groups	Liquid halogenated hydrocarbons
· 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):

108-90-7 Chlorobenzene

- 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)

108-90-7 Chlorobenzene

D

· TLV (Threshold Limit Value established by ACGIH)

108-90-7 Chlorobenzene

A3

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients are listed.

· Massachusetts State Right To Know List

108-90-7 Chlorobenzene

· New Jersey State Right To Know List

108-90-7 Chlorobenzene

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· Pennsylvania Hazardous Substances List

108-90-7 Chlorobenzene

- **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**



GHS02 GHS07 GHS08 GHS09

- **Signal word** *Danger*

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

Chlorobenzene

- **Hazard statements**

H226 Flammable liquid and vapor.

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/sparks/open flames/hot surfaces. - No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapors/spray

P273 Avoid release to the environment.

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+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 for extinction: Alcohol resistant foam.

P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.

P370+P378 In case of fire: Use for extinction: 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)

- **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.

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· **Date of preparation / last revision** 08/14/2019 / 4· **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 européen sur le transport 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**ACGIH: American Conference of Governmental Industrial Hygienists**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)**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**Flam. Liq. 3: Flammable liquids – Category 3**Acute Tox. 4: Acute toxicity – Category 4**Skin Irrit. 2: Skin corrosion/irritation – Category 2**STOT SE 3: Specific target organ toxicity (single exposure) – Category 3**STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1**Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2*