

1 Identification

- **Product identifier**
- **Trade name:** 100 PMMA Series Resists in Chlorobenzene
- **Product number:** M640002, M640003, M640004, M640005, M640006, M640007, M640008
- **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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Trade name: 100 PMMA Series Resists in Chlorobenzene

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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.*

 P260 *Do not breathe 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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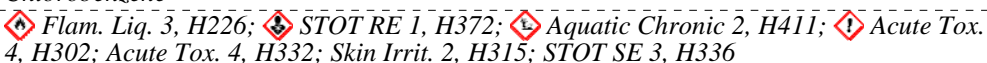
 · **vPvB:** Not applicable.

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3 Composition/information on ingredients

- **Chemical characterization:** Mixtures
- **Description:** Mixture of the substances listed below with nonhazardous additions.

- **Dangerous components:**

108-90-7	Chlorobenzene 	80-100%
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- **Additional Components:**

9010-88-2	Poly(methyl methacrylate-co-ethyl acrylate)	1-20%
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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.
- **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.
Ensure adequate ventilation
Keep away from ignition sources
- **Environmental precautions:**
Do not allow product to reach sewage system or any drains.
Inform respective authorities in case of seepage into water course or sewage system.
- **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.
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.
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 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.

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Trade name: 100 PMMA Series Resists in Chlorobenzene

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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	

 · **Ingredients with biological limit values:**
108-90-7 Chlorobenzene

BEI	100 mg/g creatinine Medium: urine Time: end of shift at end of workweek Parameter: 4-Chlorocatechol with hydrolysis (nonspecific)
	20 mg/g creatinine Medium: urine Time: end of shift at end of workweek Parameter: p-Chlorophenol with hydrolysis (nonspecific)

 · **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.

Wash hands before breaks and at the end of work.

Immediately remove all soiled and contaminated clothing.

Do not inhale gases / fumes / aerosols.

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

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

US

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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:	184 °C (363.2 °F)

· **Flash point:** 28 °C (82.4 °F)

· **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	Not determined. See Table 1 Other Information
· Vapor density	Not determined.
· Evaporation rate	Not determined.

· **Solubility in / Miscibility with**

· Water:	Water miscible No
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· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**

· Dynamic:	Not determined.
· Kinematic:	Not determined.

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Other information

Table 1. Product specific gravity and VOC data.

Name	Number	Sp. Grav.	Vol.(%by wt.)	VOC (g/L)
100C2	M640002	1.108	98	1085
100C3	M640003	1.109	97	1075
100C4	M640004	1.110	96	1065
100C5	M640005	1.111	95	1055
100C6	M640006	1.112	94	1045
100C7	M640007	1.113	93	1035
100C8	M640008	1.114	92	1025

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability** Stable under normal use conditions
- **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.
- **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:**
 No irritating effect.
 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)**

None of the ingredients are listed.

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Trade name: 100 PMMA Series Resists in Chlorobenzene

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 · **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** No further relevant information available.

 · **Behavior in environmental systems:**

 · **Bioaccumulative potential** No further relevant information available.

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

 · **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

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Trade name: 100 PMMA Series Resists in Chlorobenzene

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· UN proper shipping name	Resin solution
· DOT, ADR	RESIN SOLUTION (CHLOROBENZENE), MARINE POLLUTANT
· IMDG	RESIN SOLUTION
· IATA	

· **Transport hazard class(es)**
 · **DOT**



· **Class** 3 Flammable liquids
 · **Label** 3

· **ADR, IMDG, IATA**



· **Class** 3 Flammable liquids
 · **Label** 3

· **Packing group**
 · **DOT, ADR, IMDG, IATA** III

· **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.

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Trade name: 100 PMMA Series Resists in Chlorobenzene

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 · **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

 · **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.

P260 Do not breathe dust/fume/gas/mist/vapors/spray.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

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Trade name: 100 PMMA Series Resists in Chlorobenzene

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- 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.
- **Date of preparation / last revision** 08/12/2019 / 3
- **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
BEI: Biological 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
- *** Data compared to the previous version altered.**