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

1.1 Product identifier

Product number: 207012

Product name: AZ 4999 Photoresist

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Polishing agent for surfaces. Materials for use in technical applications

1.3 Details of the supplier of the safety data sheet

Company: Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department: PM-OQR * e-mail: PM_SDS_Supply@merckgroup.com

1.4 Emergency telephone number

Please contact the regional company representation in your country.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquids, Category 2 H225: Highly flammable liquid and vapour. On basis of test data.

Eye Irritation, Category 2 H319: Causes serious eye irritation. Calculation method

Specific target organ toxicity - single exposure, Category 3, Central nervous system H336: May cause drowsiness or dizziness. Calculation method

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms:

Signal word: Danger

Hazard statements:

H225: Highly flammable liquid and vapour.
H319: Causes serious eye irritation.
H336: May cause drowsiness or dizziness.

Supplemental Hazard: EUH066 Repeated exposure may cause skin dryness or...
SAFETY DATA SHEET  
according to Regulation (EC) No. 1907/2006

AZ 4999 Photoresist

Version: 1.0  
Product number: 207012  
Date of first issue: 08.09.2017  
Print Date: 05.02.2018

Statements: cracking.

Precautionary statements:

Prevention:
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P240 Ground/bond container and receiving equipment.

Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

Hazardous components which must be listed on the label: acetone

2.3 Other hazards
None known.

SECTION 3: Composition/information on ingredients

Chemical nature: Organic mixture in: solvent

3.1 Substance
Not applicable

3.2 Mixtures

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No. Registration number</th>
<th>Classification</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetone</td>
<td>67-64-1 01-2119471330-49-xxxx</td>
<td>Flam. Liq. 2; H225 Eye Irrit. 2; H319 STOT SE 3; H336</td>
<td>&gt;= 50 - &lt;= 100</td>
</tr>
</tbody>
</table>

Substances with a workplace exposure limit

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No. Registration number</th>
<th>Classification</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-methoxy-1-methylethyl acetate</td>
<td>108-65-6 01-2119475791-29-xxxx</td>
<td>Flam. Liq. 3; H226</td>
<td>&gt;= 1 - &lt; 10</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled: fresh air. Call in physician.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin.

The Safety Data Sheets for catalogue items are available at www.merck-performance-materials.com
4.2 Most important symptoms and effects, both acute and delayed

Symptoms: narcosis
Nausea
Vomiting
Stomach/intestinal disorders
Headache
Somnolence
Salivation
Risk of corneal clouding.
Drying-out effect resulting in rough and chapped skin.
Coma
Dizziness

4.3 Indication of any immediate medical attention and special treatment needed

Treatment: No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Water
Foam
Carbon dioxide (CO2)
Dry powder

Unsuitable extinguishing media: For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting: Combustible.

Vapours are heavier than air and may spread along floors.
Pay attention to flashback.
Forms explosive mixtures with air at ambient temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus.
SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions: Advice for non-emergency personnel:
- Do not breathe vapours, aerosols.
- Avoid substance contact.
- Ensure adequate ventilation.
- Keep away from heat and sources of ignition.
- Evacuate the danger area, observe emergency procedures, consult an expert.
Advice for emergency responders:
- Protective equipment see section 8.

6.2 Environmental precautions

Environmental precautions:
- Do not flush into surface water or sanitary sewer system.
- Risk of explosion.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up:
- Cover drains. Collect, bind, and pump off spills.
- Observe possible material restrictions (see sections 7 and 10).
- Take up with liquid-absorbent material (e.g. Chemizorb®).
- Dispose of properly. Clean up affected area.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling:
- Provide sufficient air exchange and/or exhaust in work rooms.
- Do not inhale substance/mixture.
- Avoid generation of vapours/aerosols.
- Observe label precautions.

Advice on protection against fire and explosion:
- Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures:
- Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage:
- Store in original container.
Further information on storage conditions:
- Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Protected from light.
- Risks from decomposition products: see section 10.3

Recommended storage temperature:
- Recommended storage temperature see product label.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

**Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:**

<table>
<thead>
<tr>
<th>Substance name</th>
<th>End Use</th>
<th>Exposure routes</th>
<th>Potential health effects</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetone</td>
<td>Workers</td>
<td>inhalation</td>
<td>Acute local effects</td>
<td>2420 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>dermal</td>
<td>Long-term systemic effects</td>
<td>186 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>inhalation</td>
<td>Long-term systemic effects</td>
<td>1210 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>dermal</td>
<td>Long-term systemic effects</td>
<td>62 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>inhalation</td>
<td>Long-term systemic effects</td>
<td>200 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>oral</td>
<td>Long-term systemic effects</td>
<td>62 mg/kg</td>
</tr>
</tbody>
</table>

**Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:**

<table>
<thead>
<tr>
<th>Substance name</th>
<th>Environmental Compartment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetone</td>
<td>Fresh water</td>
<td>10.6 mg/l</td>
</tr>
<tr>
<td></td>
<td>Marine water</td>
<td>1.06 mg/l</td>
</tr>
<tr>
<td></td>
<td>Fresh water sediment</td>
<td>30.4 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Marine sediment</td>
<td>3.04 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Soil</td>
<td>29.5 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Sewage treatment plant</td>
<td>100 mg/l</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

**Engineering measures**
Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

AZ 4999 Photoresist

Version: 1.0  Product number: 207012  Date of first issue: 08.09.2017
Print Date: 05.02.2018

Personal protective equipment

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled and must meet the specifications of a standard EN/ISO/DIN. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye protection : Safety glasses

Hand protection :

splash contact

Glove material : Nitrile rubber

Glove thickness : 0.4 mm

Break through time : > 10 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example: KCL 730 Camatril®-Velours (splash contact);. This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Protective measures : Flame retardant antistatic protective clothing.

Respiratory protection : required when vapours/aerosols are generated.

Recommended Filter type: : ABEK-filter

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form : liquid

Colour : yellow
to
red

Odour : like fruit
### SECTION 10: Stability and reactivity

#### 9.2 Other data

None

#### 10.1 Reactivity

Vapours may form explosive mixture with air.

#### 10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature).
10.3 Possibility of hazardous reactions

**Hazardous reactions**

- Risk of explosion with:
  - nonmetallic oxyhalides
  - halogen-halogen compounds
  - Chloroform
  - nitrating acid
  - nitrosyl compounds
  - hydrogen peroxide
  - halogen oxides
  - organic nitro compounds
  - peroxy compounds

- Risk of ignition or formation of inflammable gases or vapours with:
  - chromosulfuric acid
  - chromyl chloride
  - ethanolamine
  - Fluorine
  - Strong oxidizing agents
  - strong reducing agents
  - Nitric acid
  - chromium(VI) oxide
  - Oxidizing agents

- Violent reactions possible with:
  - alkalines
  - Peroxides

- Exothermic reaction with:
  - Bromine
  - Alkali metals
  - alkali hydroxides
  - Halogenated hydrocarbon
  - Sulphur dichloride
  - phosphorous oxichloride

10.4 Conditions to avoid

**Conditions to avoid**

- Warming.
- Exposure to light.

10.5 Incompatible materials

**Materials to avoid**

- Oxidizing agents
- Strong acids
- Bases

10.6 Hazardous decomposition products

**no information available**
SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

**Product:**
- Acute oral toxicity: No data available
- Acute inhalation toxicity: Symptoms: Possible symptoms: mucosal irritations
- Acute dermal toxicity: No data available

**Components:**
- acetone:
  - Acute oral toxicity: LD50 (Rat, female): 5.800 mg/kg
    Remarks: (ECHA)
  - Acute inhalation toxicity: LC50 (Rat): 76 mg/l
    Exposure time: 4 h
    Test atmosphere: vapour
    Remarks: (Lit.)
  - Acute dermal toxicity: LD50 (Rabbit): 20.000 mg/kg
    Remarks: (IUCLID)

2-methoxy-1-methylethyl acetate:
- Acute oral toxicity: LD50 (Rat): 8.532 mg/kg
  Remarks: (RTECS)
- Acute inhalation toxicity: No data available
- Acute dermal toxicity: No data available

Skin corrosion/irritation

**Product:**
No data available

**Components:**
- acetone:
  - Species: Rabbit
  - Result: Repeated exposure may cause skin dryness or cracking.
    Remarks: (External MSDS)

  Result: Repeated exposure may cause skin dryness or cracking.

2-methoxy-1-methylethyl acetate:
- Species: Rabbit
- Exposure time: 24 h
- Method: OECD Test Guideline 404
- Result: No irritation
**Serious eye damage/eye irritation**

**Product:**
No data available

**Components:**

*acetone:*
Species: Rabbit
Result: irritating
Remarks: (External MSDS)
Result: irritating

*2-methoxy-1-methylethyl acetate:*
Species: Rabbit
Method: OECD Test Guideline 405
Result: No eye irritation

**Respiratory or skin sensitisation**

**Product:**
No data available

**Components:**

*acetone:*
Test Type: Maximisation Test
Species: Guinea pig
Result: negative
Remarks: (ECHA)

*2-methoxy-1-methylethyl acetate:*
Test Type: Maximisation Test
Exposure routes: dermal
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.

**Germ cell mutagenicity**

**Product:**
No data available

**Components:**

*acetone:*
Genotoxicity in vitro:
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Test Type: Ames test
Species: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471  
Result: negative

Genotoxicity in vivo:  
Test Type: Micronucleus test  
Result: negative  
Remarks: (National Toxicology Program)

2-methoxy-1-methylethyl acetate:  
Genotoxicity in vitro:  
Test Type: Ames test  
Species: Salmonella typhimurium  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: negative

Carcinogenicity  
Product:  
This information is not available.  
Components:  
acetone:  
Remarks: Did not show carcinogenic effects in animal experiments.  
(IUCLID)

STOT - single exposure  
Product:  
No data available  
Components:  
acetone:  
Assessment: May cause drowsiness or dizziness.

STOT - repeated exposure  
Product:  
No data available  
Components:  
No data available  
Repeated dose toxicity  
Product:  
No data available  
Components:  
No data available
Aspiration toxicity

Product:
No data available

Components:
No data available

Experience with human exposure

Product:
No data available

Components:
No data available

11.2 Other information

Product:
Other dangerous properties can not be excluded.
narcosis
Nausea
Vomiting
Stomach/intestinal disorders
Headache
somnolence
Salivation
Risk of corneal clouding.
Drying-out effect resulting in rough and chapped skin.
Coma
Dizziness

SECTION 12: Ecological information

12.1 Toxicity

Product:
No data available

Components:
acetone:
Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): 5.540 mg/l
Exposure time: 96 h
Remarks: (Lit.)

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 6.100 mg/l
Exposure time: 48 h
Remarks: (Lit.)

EC5 (E.sulcatum): 28 mg/l
Exposure time: 72 h
Remarks: (maximum permissible toxic concentration)
(Lit.)
Toxicity to algae: NOEC (M. aeruginosa): 530 mg/l
Exposure time: 8 d
Analytical monitoring: no
Remarks: (maximum permissible toxic concentration) (IUCLID)

Toxicity to microorganisms: EC50 (activated sludge): 59 - 67.4 mg/l
Exposure time: 30 min
Remarks: (Lit.)

EC5 (Pseudomonas putida): 1.700 mg/l
Exposure time: 16 h
Remarks: (maximum permissible toxic concentration) (IUCLID)

2-methoxy-1-methylethyl acetate:

Toxicity to fish: LC50 (S. gairdnerii): 100 - 180 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 373 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae: EC50 (Pseudokirchneriella subcapitata (green algae)): > 1.000 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 201

Toxicity to microorganisms: EC10 (activated sludge): > 1.000 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 209

Toxicity to fish (Chronic toxicity): NOEC: 47.5 mg/l
Exposure time: 14 d
Species: Oryzias latipes (Orange-red killifish)
Method: OECD Test Guideline 204

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC: >= 100 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Method: OECD Test Guideline 211

12.2 Persistence and degradability

Product: No data available
Components: acetone
Biodegradability: Result: Readily biodegradable. Biodegradation: 91 % Exposure time: 28 d Remarks: (IUCLID)

Biochemical Oxygen Demand (BOD): 1.850 mg/g Incubation time: 5 d Remarks: (IUCLID)

Chemical Oxygen Demand (COD): 2.070 mg/g Remarks: (IUCLID)

ThOD: 2.200 mg/g Remarks: (Lit.)

2-methoxy-1-methylethyl acetate:
Biodegradability: Result: Readily eliminated from water Biodegradation: 100 % Exposure time: 8 d Method: OECD Test Guideline 302B

Biochemical Oxygen Demand (BOD): 330 mg/g Incubation time: 5 d Remarks: (IUCLID)

Chemical Oxygen Demand (COD): 1.740 mg/g Remarks: (IUCLID)

ThOD: 1.820 mg/g Remarks: (IUCLID)

12.3 Bioaccumulative potential

Product: No data available

Components:

acetone:
Partition coefficient: n-octanol/water: log Pow: -0.24 Method: (experimental) Remarks: Bioaccumulation is not expected. (Lit.)

2-methoxy-1-methylethyl acetate:
12.4 Mobility in soil

**Product:**
No data available

**Components:**
acetone:
No data available

2-methoxy-1-methylethyl acetate:
No data available

12.5 Results of PBT and vPvB assessment

**Product:**
Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

**Components:**
acetone:
Assessment : Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

2-methoxy-1-methylethyl acetate:
Assessment : Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

12.6 Other adverse effects

**Product:**
Additional ecological information : Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

**Product** : See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

**Air transport (IATA)**

14.1. UN/ID No. : UN 1993
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

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Version: 1.0
Product number: 207012
Print Date: 05.02.2018
Date of first issue: 08.09.2017

14.2. Proper shipping name : Flammable liquid, n.o.s.
(Acetone, 2-Methoxy-1-methylethyl acetate)

14.3. Class : 3
14.4. Packing group : II
14.5 Environmentally hazardous : --
14.6 Special precautions for user : no

Sea transport (IMDG)

14.1. UN number : UN 1993
14.2. Proper shipping name : FLAMMABLE LIQUID, N.O.S.
(Acetone, 2-Methoxy-1-methylethyl acetate)
14.3. Class : 3
14.4. Packing group : II
14.5 Environmentally hazardous : --
14.6 Special precautions for user : yes

EmS Code : F-E, S-E

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

Land transport (ADR/RID)

14.1. UN number : UN 1993
14.2. Proper shipping name : FLAMMABLE LIQUID, N.O.S.
(Acetone, 2-Methoxy-1-methylethyl acetate)
14.3. Class : 3
14.4. Packing group : II
14.5 Environmentally hazardous : --

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No 850/2004 on persistent organic pollutants : Not applicable

REACH - List of substances subject to authorisation (Annex XIV) : Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer : Not applicable

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : Not applicable

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals : Not applicable
SAFETY DATA SHEET
generated according to Regulation (EC) No. 1907/2006

AZ 4999 Photoresist

Version: 1.0       Product number: 207012       Date of first issue: 08.09.2017
Print Date: 05.02.2018

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REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (A)
P5c FLAMMABLE LIQUIDS
Quantity 1 Quantity 2
5.000 t   50.000 t
Storage class: 3
Other regulations: Take note of Dir 94/33/EC on the protection of young people at work.

---

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out.

SECTION 16: Other information

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Training advice
Provide adequate information, instruction and training for operators.

Full text of H-Statements
H225: Highly flammable liquid and vapour.
H226: Flammable liquid and vapour.
H319: Causes serious eye irritation.
H336: May cause drowsiness or dizziness.

---

Key or legend to abbreviations and acronyms used in the safety data sheet

---
The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.