SAFETY DATA SHEET

AZ MiR(TM) 701 Photoresist (14 CPS)

Version: 1.0
Revision Date: 05.02.2019
SDS Number: 70MDGM184517

SECTION 1. IDENTIFICATION

Product identifier: AZ MiR(TM) 701 Photoresist (14 CPS)

Product number: 184517

Recommended use of the chemical and restrictions on use
Recommended use: Intermediate for electronic industry
Details of the supplier of the safety data sheet


Emergency telephone: 1-800-424-9300 CHEMTREC (USA)
1-703-741-5970 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification
Flammable liquids: Category 3
Skin irritation: Category 2
Serious eye damage: Category 1
Specific target organ systemic toxicity - single exposure: Category 3 (Respiratory system)

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture: Mixture
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Chemical nature
Photoresist
Mixture contains:
organic solvents
Polymer

Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Concentration (% w/w)</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl lactate</td>
<td>60 - 70</td>
<td>97-64-3</td>
</tr>
<tr>
<td>n-Butylacetate</td>
<td>10 - 15</td>
<td>123-86-4</td>
</tr>
<tr>
<td>Diazonaphthoquinonesulfonic ester</td>
<td>1 - 10</td>
<td>87829000004-5755P</td>
</tr>
<tr>
<td>Phenolic polyol</td>
<td>1 - 5</td>
<td>87829000004-5521P</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

If inhaled
: If inhaled, remove to fresh air.
If breathing is difficult, give oxygen.
If symptoms persist, call a physician.

In case of skin contact
: In case of contact, immediately flush skin with plenty of water
for at least 15 minutes while removing contaminated clothing
and shoes.
Get medical attention if irritation develops and persists.

In case of eye contact
: Remove contact lenses.
Flush eyes with water at least 15 minutes. Get medical
attention if eye irritation develops or persists.

If swallowed
: Keep respiratory tract clear.
If conscious, drink plenty of water.
Never give anything by mouth to an unconscious person.
Obtain medical attention.

Most important symptoms and effects, both acute and delayed
: None known.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
: Use water spray, alcohol-resistant foam, dry chemical or
  carbon dioxide.

Specific hazards during fire fighting
: Combustible.
As the product contains combustible organic ingredients, fire
will produce dense black smoke containing hazardous
products of combustion (see section 10).

Further information
: Use water spray to cool unopened containers.
Prevent fire extinguishing water from contaminating surface
water or the ground water system.

Special protective equipment for fire-fighters
: In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.
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SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Refer to protective measures listed in sections 7 and 8.

Environmental precautions: The product should not be allowed to enter drains, water courses or the soil. Prevent spreading over a wide area (e.g., by containment or oil barriers). Local authorities should be advised if significant spillages cannot be contained.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling
Advice on protection against fire and explosion: Keep away from heat and sources of ignition. Take measures to prevent the build up of electrostatic charge. Avoid shock and friction.

Advice on safe handling: Do not breathe vapors or spray mist. Do not get on skin or clothing. For personal protection see section 8. Use only in area provided with appropriate exhaust ventilation.

Conditions for safe storage, including any incompatibilities
Storage conditions: Keep container tightly closed in a dry and well-ventilated place. May liberate combustible solvent vapors. Store at appropriate temperature. See label for details. Protected from light.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Butylacetate</td>
<td>123-86-4</td>
<td>TWA</td>
<td>150 ppm 710 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>200 ppm 950 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>150 ppm 710 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>150 ppm 710 mg/m³</td>
<td>OSHA P0</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th></th>
<th>STEL</th>
<th>200 ppm 950 mg/m³</th>
<th>OSHA P0</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td></td>
<td>50 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td>STEL</td>
<td></td>
<td>150 ppm</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>

Engineering measures: Handle only in a place equipped with local exhaust (or other appropriate exhaust).

Personal protective equipment

Respiratory protection: In the case of vapor formation use a respirator with an approved filter. Respirator with filter for organic vapor. Use NIOSH approved respiratory protection.

Filter type: ABEK-filter

Hand protection

Additional Protection: Chemically resistant gloves

Protective measures: Do not breathe dust/ fume/ gas/ mist/ vapors/ spray. Avoid contact with the skin and the eyes.

Eye protection: Safety glasses with side-shields

Body Protection: Protective clothing

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>liquid</td>
</tr>
<tr>
<td>Form</td>
<td>liquid</td>
</tr>
<tr>
<td>Color</td>
<td>clear</td>
</tr>
<tr>
<td></td>
<td>amber</td>
</tr>
<tr>
<td></td>
<td>red</td>
</tr>
<tr>
<td>Odor</td>
<td>strong</td>
</tr>
<tr>
<td></td>
<td>ester-like</td>
</tr>
<tr>
<td></td>
<td>sweet</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available.</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point</td>
<td>No information available.</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>311 °F (155 °C)</td>
</tr>
</tbody>
</table>
AZ MiR(TM) 701 Photoresist (14 CPS)

Flash point: 120 °F (49 °C)
Method: closed cup

Evaporation rate: No information available.

Flammability (solid, gas): No information available.

Lower explosion limit: No information available.

Upper explosion limit: No information available.

Vapor pressure: ca.4 Torr at 68 °F (20 °C)

Relative vapor density: No information available.

Density: 1.05 g/cm3

Relative density: No information available.

Water solubility: partly miscible

Partition coefficient: n-octanol/water: No information available.

Autoignition temperature: No information available.

Decomposition temperature: No information available.

Viscosity, dynamic: No information available.

 Explosive properties: Not classified as explosive.

Oxidizing properties: No information available.

SECTION 10. STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions.
Sensitivity to light

Possibility of hazardous reactions: Hazardous polymerization does not occur.

Hazardous decomposition products: Hazardous decomposition products due to incomplete combustion
Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).
AZ MIR(TM) 701 Photoresist (14 CPS)

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Product
Carcinogenicity
IARC

OSHA
NTP

No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Likely route of exposure
Eye contact, Skin contact

Acute oral toxicity
Acute toxicity estimate: 2,957 mg/kg
Calculation method

Experience with human exposure
Other Relevant Toxicity Information:
No toxicological testing was carried out on the preparation.

Components

Ethyl lactate (97-64-3):

Acute oral toxicity
LD50 Oral Rat: > 2,000 mg/kg

Acute Inhalation toxicity
LC50 Rat: > 5.4 mg/l, 8 h (External MSDS)
LC50 Rat: > 5.4 mg/l, 4 h; dust/mist (HSDB)

Acute dermal toxicity
LD50 Rabbit: > 5,000 mg/kg (HSDB)
LD50 Dermal Rabbit: > 5,000 mg/kg

Skin irritation
Human
Result: No irritation
Patch Test 24 Hrs.
(HSDB)
Eye irritation
Rabbit
Result: Eye irritation
(External MSDS)
Irritating to eyes.

Rabbit
Result: Eye irritation
(External MSDS)
Irritating to eyes.

Sensitization
Human experience
Result: negative
(HSDB)
STOT-single exposure
Assessment: May cause respiratory irritation.

n-Butylacetate (123-86-4):

Acute oral toxicity
LD50 Rat: 10.760 mg/kg
OECD Test Guideline 423 (External MSDS)

Acute inhalation toxicity
LC50 Rat: 0.74 mg/l; 4 h; aerosol (ECHA)
OECD Test Guideline 403

Acute dermal toxicity
LD50 Rabbit: > 14,100 mg/kg
OECD Test Guideline 402 (External MSDS)

Skin irritation
Rabbit
Result: Repeated exposure may cause skin dryness or cracking.
OECD Test Guideline 404
(External MSDS)

Eye irritation
Rabbit
Result: No eye irritation
OECD Test Guideline 405
(External MSDS)

Sensitization
Maximization Test Mouse
Result: Did not cause sensitization on laboratory animals
(ECHA)

Germ cell mutagenicity
Genotoxicity in vitro
Ames test
Escherichia coli/Salmonella typhimurium
Result: negative
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
(External MSDS)
Mutagenicity (mammal cell test): chromosome aberration.
Result: negative
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 473 (ECHA)

Teratogenicity
Application Route: Inhalation
Rat
Exposure time: 6 weeks
Method: OECD Test Guideline 414 (ECHA)
STOT: single exposure
Target: Organs: Central nervous system
Assessment: May cause drowsiness or dizziness.

Diazonaphthoquinonesulfonic ester (678290000004-5755P):
No information available.

Phenolic polyol (678290000004-5521P):

Acute oral toxicity
LD50 Rat: > 5,000 mg/kg
OECD Test Guideline 401 (ECHA)

Skin irritation
Rabbit
Result: No skin irritation
OECD Test Guideline 404 (Lit.)

Eye irritation
Rabbit
Result: No eye irritation
OECD Test Guideline 405 (Lit.)

Germ cell mutagenicity
Genotoxicity in vitro
Ames test
Result: negative
Metabolic activation: with and without metabolic activation
(Own results)

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Product

Persistence and degradability
No information available.
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Bioaccumulative potential
No information available.

Mobility in soil
No information available.

Additional ecological information
No ecological testing was carried out on the preparation.

Components

Ethyl lactate (97-64-3):

Toxicity to fish
LC50 Danio rerio (zebra fish): 320 mg/l; 96 h (External MSDS)
LC50 Danio rerio (zebra fish): 320 mg/l; 96 h

Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia magna (Water flea): 560 mg/l; 48 h (External MSDS)
EC50 Daphnia magna (Water flea): 560 mg/l; 48 h

Toxicity to algae
ErC50 Pseudokirchneriella subcapitata (green algae): 3,500 mg/l; 72 h
ErC50 Pseudokirchneriella subcapitata (green algae): 3,500 mg/l; 72 h

Biodegradability
(External NSDS)
Readily biodegradable.

OECD
(External NSDS)
Readily biodegradable.

Partition coefficient: n-octanol/water
log Pow: ca. -0.04
(calculated)
(Lit.) Bioaccumulation is not expected.

Bioaccumulation
(Bioaccumulation is unlikely. (External MSDS))
n-Butyraldehyde (123-66-4):

Toxicity to fish
flow-through test LC50 Pimephales promelas (fathead minnow): 18 mg/l; 96 h
Analytical monitoring: yes
OECD Test Guideline 203 (External MSDS)

LC50 Lepomis macrochirus (Bluegill sunfish): 100 mg/l; 96 h

Toxicity to daphnia and other aquatic invertebrates
static test EC50 Daphnia magna (Water flea): 44 mg/l; 48 h (ECHA)

Toxicity to algae
static test ErC50 Desmodesmus subspicatus (green algae): 674.7 mg/l, 72 h (ECHA)

Toxicity to bacteria
EC50 Pseudomonas putida: 959 mg/l; 18 h (IUCLID)

Biodegradability
83 %, 28 d, aerobic
OECD Test Guideline 301D (ECHA)
Readily biodegradable.

Theoretical oxygen demand (ThOD)
2,207 mg/g
(Lit.)

Ratio BOD/ThBOD
BOD5 7 - 46 %
(Lit.)

Partition coefficient: n-octanol/water
log Pow: 2.3 (25 °C)
OECD Test Guideline 107
Bioaccumulation is not expected.

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

Surface tension
61.3 mN/m
at 20 °C

Diazonaphthoquinonesulfonic ester (67829000004-5755P):

Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia magna (Water flea): > 17.6 mg/l, 48 h
OECD Test Guideline 202
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Biodegradability
10 %: 28 d
(ECHA)
Not readily biodegradable.

Partition coefficient: n-octanol/water
log Pow: >= 4.5 (25 °C)
Potential bioaccumulation (ECHA)

Phenolic polyol (67829000004-5521P):

Toxicity to daphnia and other aquatic invertebrates
Daphnia magna (Water flea): 95 h
CECD Test Guideline 202 No observable toxic effect in saturated solution.

Partition coefficient: n-octanol/water
log Pow: 3 (24 °C)
Bioaccumulation is not expected.

Surface tension
71.8 mN/m
at 20 °C

SECTION 13. DISPOSAL CONSIDERATIONS

Product Waste: Dispose of as hazardous waste in compliance with local and national regulations.
For disposal, this material is a flammable hazardous waste under RCRA.

Contaminated packaging: Empty containers should be taken to an approved waste handling site for recycling or disposal.

RCRA number: RCRA number: D001
Yes -- If it becomes a waste as sold.

SECTION 14. TRANSPORT INFORMATION

DOT / 49CFR
UN/ID/NA number: UN NA 1993
Proper shipping name: Combustible liquid, n.o.s.
(Ethyl lactate, n-Butyl acetate)
Class: CBL
Packing group: III
Labels: None
ERG Code: 128
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Version: 1.0
Revision Date: 05.02.2019
SDS Number: 70MDGM184517

Marine pollutant: no
International Regulations

IATA-DGR
UN/ID No.: UN 1993
Proper shipping name: Flammable liquid, n.o.s.
                    (Ethyl lactate, n-Butyl acetate)
Class: 3
Packing group: III
Labels: Flammable Liquids
Packing instruction (cargo aircraft): 366
Packing instruction (passenger aircraft): 355

IMDG-Code
UN number: UN 1993
Proper shipping name: FLAMMABLE LIQUID, N.O.S.
                    (Ethyl lactate, n-Butyl acetate)
Class: 3
Packing group: III
Labels: 3
EmS Code: F-E, S-E
Marine pollutant: no

Special precautions for user
Not applicable

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity
n-Butylacetate 123-88-4 5000lbs
*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
Clean Air Act
This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App. A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC’s (40 CFR 60.489):
   n-Butylacetate
   123-86-4

Clean Water Act
The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:
   n-Butylacetate
   123-86-4

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:
   n-Butylacetate
   123-86-4

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations
Massachusetts Right To Know
   Ethyl lactate
   97-64-3
   n-Butylacetate
   123-86-4

Pennsylvania Right To Know
   Ethyl lactate
   97-64-3
   n-Butylacetate
   123-86-4
   Diazonaphthoquinonesulfonic ester
   67829000004-5755P
   Phenolic polyol
   67829000004-5521P

New Jersey Right To Know
   Ethyl lactate
   97-64-3
   n-Butylacetate
   123-86-4
   Diazonaphthoquinonesulfonic ester
   67829000004-5755P
   Phenolic polyol
   67829000004-5521P

California Prop. 65
   This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

The ingredients of this product are reported in the following inventories:

DSL
   : This product contains one or several components that are not on the Canadian DSL nor NDSL.

TSCA
   : One or more components of this product are not listed on the
TSCA Inventory. The components, however, are covered by Low Volume Exemptions (LVEs).

TSCA List
The following substance(s) is/are subject to a Significant New Use Rule:
Phenolic polyol 67829000004-5521P

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:
4,4'-(1-[4-{1-(4-Hydroxyphenyl)-1-methylene]phenyl}ethyldene]bisphenol 110726-28-8

Other Regulatory Information
This product contains a substance which is subject, under TSCA 5(a), to Significant New Use Rule (SNUR). The SNUR allows for use with restrictions set forth in 40 CFR 721.10325. Processes which result in surface water concentrations of the substance exceeding 10 ppb are not permitted. It also has a TSCA Section 12(b) export notification requirement, if exporting the product.

This product is subject to the Export and Customs Control Regulations of the United States and is not to be exported or transferred without prior notification to and approval by the vendor, and not without obtaining proper U.S.A. and local government authorizations. ECCN 3C992

SECTION 16. OTHER INFORMATION

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.