



SAFETY DATA SHEET
AZ nLOF 2020 Photoresist

Substance No.: 000000501935
Version 4.1

Revision Date 04/03/2015
Print Date 11/13/2015

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

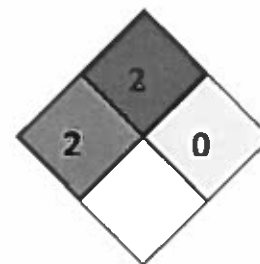
Product name : AZ nLOF 2020 Photoresist
Product Use Description : Intermediate for electronic industry
Company : EMD Performance Materials Corp.
An affiliate of Merck KGaA, Darmstadt Germany
One International Plaza, Suite 300
Philadelphia, PA 19113
Telephone : 1-888-367-3275
Emergency telephone number : 1-800-424-9300 (CHEMTREC)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

HMIS Classification : Health hazard: 2
Flammability: 2
Reactivity: 0
PPE:X

NFPA Classification : Health hazard: 2
Fire Hazard: 2
Reactivity Hazard: 0
Special Hazards: NONE



GHS Classification

Hazard category, Hazard class : Flammable liquids, Category 3
Hazard category, Hazard class : Eye irritation, Category 2A
Hazard category, Hazard class : Specific target organ toxicity - single exposure



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GHS-Labeling

Symbol(s)



Signal word

: Warning

Hazard statements

: Flammable liquid and vapour.
Causes serious eye irritation.
May cause respiratory irritation, and drowsiness or dizziness.

Precautionary statements

: **Prevention:**
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Take precautionary measures against static discharge.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists:
Get medical advice/ attention.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
Storage:
Store in a well-ventilated place. Keep cool.
Store in a closed container.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Special labelling of certain mixtures :

The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: < 28 %



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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous ingredients

Component	CAS-No.	Weight percent
1-Methoxy-2-propanol acetate	108-65-6	65 - 75
Modified melamine-formaldehyde resin	67829000004-5594P	< 4
2-Methoxy-1-propanol acetate	70657-70-4	< 0.3
Formaldehyde	50-00-0	< 0.01

Non-hazardous ingredients

Component	CAS-No.	Weight percent
Cresol novolak resin	67829000004-5792P	20 - 25
Benzeneacetonitrile derivative	67829000004-5765P	< 2
Phenolic polyol	67829000004-5798P	< 1

SECTION 4. FIRST AID MEASURES

First aid procedures

- General advice** : Remove contaminated clothing immediately and clean affected parts of the body thoroughly.
- Inhalation** : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If symptoms persist, call a physician.
- Skin contact** : Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.
- Eye contact** : Remove contact lenses. Flush eyes with water at least 15 minutes. Get medical attention if eye irritation develops or persists.
- Ingestion** : Keep respiratory tract clear. If conscious, drink plenty of water. Never give anything by mouth to an unconscious person. Obtain medical attention.



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SECTION 5. FIREFIGHTING MEASURES

Flammable properties

Flash point : 114 °F (46 °C)
Method: closed cup

Fire fighting

Suitable extinguishing media : Carbon dioxide, water, alcohol resistant foam, dry chemical.

Further information : In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.
Cool containers/tanks with water spray.

Protective equipment and precautions for firefighters

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

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Wear suitable personal protective equipment.
Avoid contact with skin and eyes.
Keep away sources of ignition.

Environmental precautions : Do not allow entry to drains, water courses or soil
Prevent spreading by use of suitable barriers.
Local authorities should be advised if significant spillages cannot be contained.

Methods for containment /
Methods for cleaning up : Wearing appropriate personal protective equipment, contain spill, ventilate area of spill or leak, remove all sparking devices or ignition sources, collect onto inert absorbent, and place in a suitable container.

SECTION 7. HANDLING AND STORAGE

Handling

Handling : Do not breathe vapours 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.



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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.

Storage

Further information on 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.

Advice on common storage : Do not store with acids or alkalies
Do not store with strong oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Components with workplace control parameters

Components	CAS-No.	Control parameters	Basis
1-Methoxy-2-propanol acetate	108-65-6	TWA: 50 ppm	US WEEL

Engineering measures

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

Personal protective equipment

Eye protection : Safety eyewear to protect against splashes.

Hand protection : Solvent-resistant gloves

Skin and body protection : Clothing suitable to prevent skin contact.

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

Hygiene measures : Observe the usual precautions when handling chemicals.



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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form : Liquid
Color : Clear, colorless to pale yellow
Odor : Strong, characteristic odor.

Safety data

Flash point : 114 °F (46 °C)
Method: closed cup
pH : Not applicable
Starts to boil : 293 °F (145 °C)
Vapour pressure : 3.2 Torr
at 68 °F (20 °C)
Density : 1.041 g/cm³
Water solubility : The solvent is water soluble but the product forms two layers.
VOC : 734 g/l (Calculated value)
Loss on drying : >= 70 %

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid : Avoid contact with oxidizing agents.
Avoid contact with strong acids.
Avoid contact with alkaline materials.
Hazardous decomposition products : Thermal decomposition may generate carbon dioxide, carbon monoxide, and oxides of nitrogen and sulfur.
Hazardous reactions : Hazardous polymerisation does not occur.
Chemical stability : Stable under normal conditions.



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SECTION 11. TOXICOLOGICAL INFORMATION

Data for AZ nLOF 2020 Photoresist

Further information : No toxicological testing was carried out on the preparation.

Data for 1-Methoxy-2-propanol acetate (108-65-6)

Acute oral toxicity : LD50: 8,532 mg/kg
Species: rat

Acute inhalation toxicity : LC50: > 23.8 mg/l
Exposure time: 6 h
Species: rat

Acute dermal toxicity : LD50: > 5,000 mg/kg
Species: rabbit

Skin irritation : Result: non-irritant

Eye irritation : Result: Moderate eye irritation
Source : Supplier MSDS

Sensitisation : Species: Guinea pig
Result: non-sensitizing

Toxicology Assessment

CMR effects : Teratogenicity:
Oral and Inhalation developmental toxicity studies were conducted in pregnant rats and rabbits with PGMEA (1-Methoxy-2-propanol acetate) containing approximately 2% beta isomer (cited in 1-METHOXY-2-PROPANOL ACETATE OECD SIDS Report). No statistically significant effects were noted in developmental parameters at any of the dose levels tested (Oral study - up to 1,000 mg/kg/day and inhalation study - up to 4000 ppm).

Data for 2-Methoxy-1-propanol acetate (70657-70-4)

Acute inhalation toxicity : Data refers to Beta Isomer



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Toxicology Assessment

CMR effects

: Teratogenicity:

The beta isomer, 2-Methoxy-1-propanol acetate, was tested by itself for developmental/teratogenic effects in pregnant rats and rabbits. Developmental/teratogenic effects were observed in both species via the inhalation route of exposure. In rabbits, the effects only occurred in the highest dose group (545 ppm) in absence of any significant maternal toxicity. In rats, these effects were also only observed in the highest dose group, but in the presence of significant maternal toxicity, which placed the cause of the developmental effects in question. The No Observable Adverse Effect Level, NOAEL, for the inhalation exposures in rabbits with the pure beta isomer was determined to be 145 ppm, this equates to exposure of 1-Methoxy-2-propanol acetate with a level of beta isomer > 2%. Since this Product formulation contains < 0.3% of the beta isomer, it is judged that exposure to this product formulation does not pose a reproductive hazard.

Data for Modified melamine formaldehyde resin (67829000004-5594P)

Acute inhalation toxicity : LC50: > 2500 ppm
Exposure time: 4 h
Species: rat
Source : Supplier MSDS

Acute dermal toxicity : LD50: > 2 mg/kg
Species: rabbit
Source : Supplier MSDS

Eye irritation : Classification: Irritating to eyes.
Source: EU CLP/GHS Classification

SECTION 12. ECOLOGICAL INFORMATION

Data for AZ nLOF 2020 Photoresist

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



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Data for 1-Methoxy-2-propanol acetate (108-65-6)

Ecotoxicity effects

- Toxicity to fish : LC50: 100 - 180 mg/l Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
- : LC50: 161 mg/l Exposure time: 96 h
Species: Fish general (Pisces)
- : NOEC: 100 mg/l Exposure time: 96 h
Species: Fish general (Pisces)
- Toxicity to daphnia and other aquatic invertebrates : EC50: > 500 mg/l
Species: Daphnia magna
- Toxicity to bacteria : EC20: 1,000 mg/l
Exposure time: 30 min
Species: activated sludge

Elimination information (persistence and degradability)

- Biodegradability : Method: OECD 302 B
: The product is biodegradable.

Data for Modified melamine formaldehyde resin (67829000004-5594P)

Ecotoxicity effects

- Toxicity to fish : LC50: > 603.1 mg/l Exposure time: 96 h
Species: Lepomis macrochirus (Bluegill sunfish)
- Toxicity to daphnia and other aquatic invertebrates : EC50: > 63 mg/l
Species: Daphnia magna (Water flea)

SECTION 13. DISPOSAL CONSIDERATIONS

- Further information : 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 : Packaging that cannot be cleaned should be disposed of as product waste
- RCRA hazardous waste : RCRA number: D001
Yes -- If it becomes a waste as sold.



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SECTION 14. TRANSPORT INFORMATION

DOT
Not restricted

IATA
UN number : 1993
Description of the goods : Flammable liquid, n.o.s.
(2-Methoxy-1-methylethyl acetate)
Class : 3
Packing group : III
Labels : 3
Environmentally hazardous : no
Additional data for transport : PASSENGER AIRCRAFT SHIPMENT OF GLASS
CONTAINERS >2.5L NOT PERMITTED. CARGO AIRCRAFT
ONLY!

IMDG
UN number : 1993
Description of the goods : FLAMMABLE LIQUID, N.O.S.
(2-Methoxy-1-methylethyl acetate)
Class : 3
Packing group : III
Labels : 3
EmS Number 1 : F-E
EmS Number 2 : S-E
Marine pollutant : no
Environmentally hazardous : no

SECTION 15. REGULATORY INFORMATION

Notification status

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). These LVE-based products may only be used in conventional photolithographic processes consistent with their design. For any applications outside of this intended purpose, contact the vendor first.

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



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- WHMIS Classification** : B3: Combustible Liquid
- Canadian PBT Chemicals** : This product does not contain any components on the DSL that are classified as Persistent, Bioaccumulative and Toxic (PBT) under CEPA.
- CERCLA Reportable Quantity** :
Calculated RQ exceeds reasonably attainable upper limit.

Carcinogenicity

- IARC** : No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- OSHA** : No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
- NTP** : No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- ACGIH** : No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

EPCRA - Emergency Planning and Community Right-to-Know Act

- SARA 302 Reportable Quantity** : This material does not contain any components with a SARA 302 RQ.
- SARA 304 Extremely Hazardous Substances** : This material does not contain any components with a section 304 EHS RQ.

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

- Ozone-Depletion Potential** : 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).

US. Clean Air Act - Hazardous Air Pollutants (HAP)

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):
Formaldehyde 50-00-0



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US. Clean Air Act Section 112(r); Regulated toxic and flammable substances for Accidental Release Prevention - 40 CFR 68.130 (subpart F)

The following chemical(s) are listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F):

Formaldehyde 50-00-0

US. Clean Air Act Section 111 SOCM I Intermediate or Final Volatile Organic Compunds (VOC) - 40 CFR part 60.489

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCM I Intermediate or Final VOC's (40 CFR 60.489):

Formaldehyde 50-00-0

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

Formaldehyde 50-00-0

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

Formaldehyde 50-00-0

US State Regulations

Massachusetts Right To Know Components : Formaldehyde 50-00-0

Pennsylvania Right To Know Components : 1-Methoxy-2-propanol acetate 108-65-6
Cresol novolak resin 67829000004-5792P
Modified melamine-formaldehyde resin 67829000004-5594P
Formaldehyde 50-00-0

New Jersey Right To Know Components : 1-Methoxy-2-propanol acetate 108-65-6
Cresol novolak resin 67829000004-5792P
Modified melamine-formaldehyde resin 67829000004-5594P



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Benzeneacetonitrile derivative	67829000004-5765P
Phenolic polyol	67829000004-5798P
Phenolic compound	67829000004-5803P

California Prop. 65 Components : WARNING! This product contains a chemical known to the State of California to cause cancer.

Formaldehyde 50-00-0

SECTION 16. OTHER INFORMATION

This information is supplied under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, and is offered in good faith based on data available to us that we believe to be true and accurate. For any sub-heading within any section not addressed herein, no relevant information is determined or applicable. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable to the material. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate for that use. No warranty, express or implied, is made regarding the accuracy of this data, the hazards connected with the use of the material, or the results to be obtained from the use thereof. We assume no responsibility for damage or injury from the use of the product described herein. Data provided here are typical and not intended for use as product specifications.

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