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

1.1 Product identifier
Trade name: AZ nLOF® 2020 Photoresist

1.2 Relevant identified uses of the substance or mixture and uses advised against
Use of the Substance/Mixture: Electronic industry
Intermediate for electronic industry

1.3 Details of the supplier of the safety data sheet
Company: Merck Performance Materials GmbH
Rheingaustrasse 190-196,
65203 Wiesbaden Germany

Telephone: +49 (0)611 962 8563

E-mail address of person responsible for the SDS: PSE@merckgroup.com

1.4 Emergency telephone number
Emergency telephone number: +49 69 305 6418 (24/7, English and German)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification (REGULATION (EC) No 1272/2008)
GHS Classification
Flammable liquids, Category 3
H226: Flammable liquid and vapour.

2.2 Label elements
GHS-Labelling
Symbol(s):

Signal word: Warning
Hazard statements: H226 Flammable liquid and vapour.
Precautionary statements:

**Prevention:**
- P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- P233: Keep container tightly closed.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**
- P303 + P361 + P353: IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- P370 + P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

**Storage:**
- P403 + P235: Store in a well-ventilated place. Keep cool.

2.3 Other hazards

No information available.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

**Chemical characterization**
Preparation of polymer resins and light sensitive compounds in organic solvents (halogenfree).

**Hazardous components**

<table>
<thead>
<tr>
<th>2-methoxypropyl acetate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
</tr>
<tr>
<td>EC-No.</td>
</tr>
<tr>
<td>Classification</td>
</tr>
<tr>
<td>(REGULATION (EC) No 1272/2008)</td>
</tr>
<tr>
<td>Concentration [%]</td>
</tr>
</tbody>
</table>

**WEL substance:**

<table>
<thead>
<tr>
<th>2-methoxy-1-methylethyl acetate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
</tr>
<tr>
<td>EC-No.</td>
</tr>
<tr>
<td>Registration number</td>
</tr>
<tr>
<td>Classification</td>
</tr>
<tr>
<td>(REGULATION (EC) No 1272/2008)</td>
</tr>
<tr>
<td>Concentration [%]</td>
</tr>
</tbody>
</table>
For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Remove contaminated clothing immediately and clean affected parts of the body thoroughly.

Inhalation: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

Skin contact: Wash off immediately with plenty of water. If skin irritation persists, call a physician.

Eye contact: Immediately flush eye(s) with plenty of water. Protect unharmed eye. Remove contact lenses.

Ingestion: If symptoms persist, call a physician. Show this safety data sheet to the doctor in attendance.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment: Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: water spray jet
carbon dioxide
dry powder
alcohol-resistant foam

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting: In case of fires, hazardous combustion gases are formed:
Carbon monoxide (CO)
Carbon dioxide (CO2)
Nitrogen oxides (NOx)
Sulphur oxides

5.3 Advice for firefighters

Special protective equipment for firefighters: Use self-contained breathing apparatus
Approved chemical suits
Further information: Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

<table>
<thead>
<tr>
<th>SECTION 6: Accidental release measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Personal precautions, protective equipment and emergency procedures</td>
</tr>
<tr>
<td>Personal precautions: Wear suitable personal protective equipment. Avoid contact with skin and eyes. Keep away sources of ignition.</td>
</tr>
<tr>
<td>6.2 Environmental precautions</td>
</tr>
<tr>
<td>Environmental precautions: Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.</td>
</tr>
<tr>
<td>6.3 Methods and materials for containment and cleaning up</td>
</tr>
<tr>
<td>Methods for cleaning up: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Clean contaminated floors and objects thoroughly while observing environmental regulations.</td>
</tr>
<tr>
<td>6.4 Reference to other sections</td>
</tr>
<tr>
<td>Additional advice: Information regarding Waste Disposal, see chapter 13.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION 7: Handling and storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Precautions for safe handling</td>
</tr>
<tr>
<td>Advice on safe handling: Provide sufficient air exchange and/or exhaust in work rooms.</td>
</tr>
<tr>
<td>Advice on protection against fire and explosion: Normal measures for preventive fire protection.</td>
</tr>
<tr>
<td>7.2 Conditions for safe storage, including any incompatibilities</td>
</tr>
<tr>
<td>Requirements for storage areas and containers: Store in original container.</td>
</tr>
<tr>
<td>Further information on storage conditions: Keep container tightly closed in a dry and well-ventilated place. Protect against light.</td>
</tr>
<tr>
<td>Advice on common storage: Do not store with acids or alkalies. Do not store with strong oxidizing agents</td>
</tr>
</tbody>
</table>
SECTIon 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>2-methoxy-1-methylethyl acetate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
<td>108-65-6</td>
</tr>
<tr>
<td>Value</td>
<td>AGW</td>
</tr>
</tbody>
</table>
| Control parameters | 50 ppm  
|               | 270 mg/m3                        |
| Category short-time exposure | 1;(I) |
| Update     | 2006-01-01                       |
| Basis      | DE TRGS 900                      |
| Further information | DFG: Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission). European Union (The EU has established a limit value: deviations in value and peak limit are possible) When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child |

<table>
<thead>
<tr>
<th>Components</th>
<th>2-methoxypropyl acetate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
<td>70657-70-4</td>
</tr>
<tr>
<td>Value</td>
<td>AGW</td>
</tr>
</tbody>
</table>
| Control parameters | 5 ppm  
|               | 28 mg/m3                |
| Category short-time exposure | 8;(II) |
| Update     | 2006-01-01              |
| Basis      | DE TRGS 900             |
| Further information | DFG: Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission). Skin absorption When there is compliance with the OEL and biological tolerance values, harm to the unborn child can not be excluded |

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

- 2-methoxy-1-methylethyl acetate
  - End Use: Workers
  - Exposure routes: Skin contact
  - Potential health effects: Chronic effects
  - Value: 54.8 mg/kg

- End Use: Workers
  - Exposure routes: Inhalation
  - Potential health effects: Chronic effects
AZ nLOF® 2020 Photoresist

Substance No.: 000000501935

Revision Date 17.04.2015
Print Date 13.08.2015
Version 1.0 DE-GHS

Value: 33 mg/m³

End Use: Workers
Exposure routes: Ingestion
Potential health effects: Chronic effects
1.67 mg/kg

End Use: Consumers
Exposure routes: Skin contact
Potential health effects: Chronic effects
153.5 mg/kg

End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Chronic effects
275 mg/kg

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

2-methoxy-1-methylethylacetate

- Fresh water
  Value: 0.635 mg/l

- Marine water
  Value: 0.0635 mg/l

- Fresh water sediment
  Value: 3.29 mg/kg

- Marine sediment
  Value: 0.329 mg/kg

- Soil
  Value: 0.29 mg/kg

8.2 Exposure controls

Engineering measures
Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment

Respiratory protection
Use respiratory protection in case of insufficient exhaust ventilation or prolonged exposure
Recommended Filter type:
ABEK-filter

Hand protection
Break through time: > 10 min
Glove thickness: > 0.4 mm
For short-term exposure (splash protection):
Nitrile rubber gloves.
Remarks: These types of protective gloves are offered by various manufacturers. Please note the manufacturers’ detailed statements, especially about the minimum thickness and the minimum breakthrough time. Consider also the particular working conditions under which the gloves are being used.

Eye protection : Tightly fitting safety goggles
Skin and body protection : protective clothing
Hygiene measures : When using do not eat, drink or smoke. Keep away from food and drink. Wash hands before breaks and at the end of workday. Use barrier skin cream.
Protective measures : Do not breathe vapours or spray mist. Avoid contact with skin and eyes. Observe the usual precautions for handling chemicals.

Environmental exposure controls
General advice : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Colour</td>
<td>slightly yellowish, clear</td>
</tr>
<tr>
<td>Odour</td>
<td>strongly product-specific</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>ca. 48 °C</td>
</tr>
<tr>
<td>Ignition temperature</td>
<td>not determined</td>
</tr>
<tr>
<td>Thermal decomposition</td>
<td>not determined</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>not determined</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>not determined</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>not determined</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>not determined</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>not determined</td>
</tr>
<tr>
<td>Burning number</td>
<td>not determined</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Freezing point: not determined
Starts to boil: 145 °C
Sublimation point: not determined
Vapour pressure: 0,0 hPa
Density: 1,041 g/cm3
Water solubility: The solvent is water soluble but the product forms two layers.
Partition coefficient: not reasonable
n-octanol/water
Solubility in other solvents: not determined
Viscosity, dynamic: 32 mPas
Viscosity, kinematic: not determined
Relative vapour density: not determined
Corrosive in contact with metals: not determined
Evaporation rate: not determined

9.2 Other information

SECTION 10: Stability and reactivity

10.1 Reactivity
No dangerous reaction known under conditions of normal use.

10.2 Chemical stability
No decomposition if stored and applied as directed.

10.3 Possibility of hazardous reactions
Hazardous reactions: Reactions with acids, alkalies and oxidizing agents.

10.4 Conditions to avoid
Conditions to avoid: Heat, flames and sparks.

10.5 Incompatible materials
Materials to avoid: Oxidizing agents
Strong acids
Bases

10.6 Hazardous decomposition products
Hazardous decomposition products: Carbon oxides
Nitrous oxides (NOx)
Sulphurous oxides (SOx)

SECTION 11: Toxicological information

11.1 Information on toxicological effects
AZ nLOF® 2020 Photoresist

Product
Acute oral toxicity : no data available
Acute inhalation toxicity : no data available
Acute dermal toxicity : no data available
Skin corrosion/irritation : no data available
Serious eye damage/eye irritation : no data available
Respiratory or skin sensitisation : no data available

Components:
2-methoxypropyl acetate :
Reproductive toxicity : May damage the unborn child.

2-methoxy-1-methylethyl acetate :
Acute oral toxicity : LD50: > 8.532 mg/kg, rat(female)
Acute inhalation toxicity : LC50: > 10.8 mg/l, 6 h, rat,
Acute dermal toxicity : LD50: > 5.000 mg/kg, rabbit

SECTION 12: Ecological information

12.1 Toxicity
Components:
2-methoxy-1-methylethyl acetate:
Toxicity to fish : LC50 (Oryzias latipes (Orange-red killifish)): 100 mg/l
Exposure time: 96 h
Test Type: semi-static test

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

12.2 Persistence and degradability
Components:
2-methoxy-1-methylethyl acetate :
Biodegradability : Result: Readily biodegradable.
Biodegradation: 99 %
Exposure time: 28 d
12.3 Bioaccumulative potential

**Components:**
2-methoxy-1-methylethyl acetate:
- Bioaccumulation: Remarks: Bioaccumulation is unlikely.
- Partition coefficient: n-octanol/water: log Pow: 1.2

12.4 Mobility in soil

**Components:**
2-methoxy-1-methylethyl acetate:
- Distribution among environmental compartments: Koc: 1.7 Remarks: Highly mobile in soils

12.5 Results of PBT and vPvB assessment

**Components:**
2-methoxy-1-methylethyl acetate:
- Assessment: The substance does not fulfill the PBT criteria. The substance does not fulfill the vPvB criteria.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

- **Product:** Dispose of contents/container to an approved waste disposal plant.
- **Contaminated packaging:** Packaging that cannot be cleaned should be disposed of as product waste. Uncleaned packaging may present an explosion hazard.

SECTION 14: Transport information

**ADR**
- **UN number:** 1993
- **Description of the goods:** FLAMMABLE LIQUID, N.O.S. (2-Methoxy-1-methylethyl acetate)
- **Class:** 3
- **Packing group:** III
- **Classification Code:** F1
AZ nLOF® 2020 Photoresist

Substance No.: 000000501935

Revision Date 17.04.2015
Print Date 13.08.2015

Version 1.0 DE-GHS

SECTION 15: Regulatory information

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

International Chemical Weapons Convention (CWC)
Schedules of Toxic Chemicals and Precursors

Neither banned nor restricted

REACH - Restrictions on the manufacture, placing on
the market and use of certain dangerous substances,
preparations and articles (Annex XVII)

108-65-6

Regulation (EC) No 649/2012 of the European
Parliament and the Council concerning the export and
import of dangerous chemicals

Neither banned nor restricted

REACH - Candidate List of Substances of Very High
Concern for Authorisation (Article 59).
This product does not contain
substances of very high concern
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

AZ nLOF® 2020 Photoresist
Substance No.: 000000501935 Revision Date 17.04.2015
Version 1.0 DE-GHS Print Date 13.08.2015

15.2 Chemical Safety Assessment
A Chemical Safety Assessment is not required for a mixture.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H226 Flammable liquid and vapour.
H335 May cause respiratory irritation.
H360D May damage the unborn child.

Decimal notation: "Thousands" places are identified with a dot (example: 2.000 mg/kg means "two thousand mg/kg"). Decimal places are identified with a comma (example: 1,35 g/cm3)

Further information

Further information : Observe national and local legal requirements

The information provided in this 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.

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