1. Identification

Product identifier

mr-DWL Series

Recommended use of the chemical and restrictions on use

Use of the substance/mixture

Photoresist

Product Categories [PC] 30: Photosensitive agent and other photochemicals

Sector of uses [SU] 16: Manufacture of computer, electronic and optical products, electrical equipment.

Uses advised against

Do not use for private purposes (household).

Details of the supplier of the safety data sheet

Company name: micro resist technology GmbH

Street: Koepenicker Str. 325

Place: D-12555 Berlin

Telephone: +49 30 641670-100

Telefax: +49 30 641670-200

e-mail: safety@microresist.de

Internet: www.microresist.de

Emergency phone number: Chemtrec (International): +1 703 527 3887

2. Hazard(s) identification

Classification of the chemical

Hazard categories:

- Flammable liquid: Flam. Liq. 4
- Skin corrosion/irritation: Skin Corr. 1B
- Serious eye damage/eye irritation: Eye Dam. 1
- Respiratory/skin sensitization: Skin Sens. 1
- Specific target organ toxicity - single exposure: STOT SE 3

Hazard Statements:

- Combustible liquid
- Causes severe skin burns and eye damage
- May cause an allergic skin reaction
- May cause drowsiness or dizziness

Label elements

Signal word: Danger

Pictograms: corrosion; exclamation mark

Hazard statements

- Combustible liquid
- Causes severe skin burns and eye damage
- May cause an allergic skin reaction
- May cause drowsiness or dizziness

Precautionary statements

- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Keep cool.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wear protective gloves/protective clothing/eye protection/face protection.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Dispose of contents/container to ....

**Hazards not otherwise classified**

No information available.

### 3. Composition/information on ingredients

#### Mixtures

**Hazardous components**

<table>
<thead>
<tr>
<th>CAS No</th>
<th>Components</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>28906-96-9</td>
<td>epoxy resin</td>
<td>20 - 70 %</td>
</tr>
<tr>
<td>96-48-0</td>
<td>Gamma Butyrolactone</td>
<td>15 - 60 %</td>
</tr>
<tr>
<td>108-32-7</td>
<td>propylene carbonate</td>
<td>1 - 15 %</td>
</tr>
<tr>
<td>60565-88-0</td>
<td>bis(p-tolyl)iodonium hexafluorophosphate</td>
<td>1 - 15 %</td>
</tr>
</tbody>
</table>

### 4. First-aid measures

**Description of first aid measures**

**General information**
In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

**After inhalation**
Provide fresh air. In case of breathing difficulties administer oxygen. If victim is at risk of losing consciousness, position and transport on their side. In case of respiratory tract irritation, consult a physician.

**After contact with skin**
After contact with skin, wash immediately with plenty of water and soap. Change contaminated clothing. In case of skin irritation, seek medical treatment.

**After contact with eyes**
Rinse immediately carefully and thoroughly with eye-bath or water. Consult an ophthalmologist.

**After ingestion**
Rinse mouth immediately and drink plenty of water.
Caution if victim vomits: Risk of aspiration!
Medical treatment necessary.

**Most important symptoms and effects, both acute and delayed**
Causes severe skin burns and eye damage.
May cause an allergic skin reaction.
May cause drowsiness or dizziness.

**Indication of any immediate medical attention and special treatment needed**
Treat symptomatically.

### 5. Fire-fighting measures

**Extinguishing media**

**Suitable extinguishing media**
Carbon dioxide (CO2). Dry extinguishing powder. Foam.

**Unsuitable extinguishing media**
High power water jet.
Specific hazards arising from the chemical
In case of fire and/or explosion do not breathe fumes.

Special protective equipment and precautions for fire-fighters
In case of fire: Wear self-contained breathing apparatus. Wear chemical resistant suit.

Additional information
Use water spray jet to protect personnel and to cool endangered containers. Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Provide adequate ventilation. Do not breathe gas/fumes/vapour/spray. Avoid contact with skin, eyes and clothes. Wear personal protection equipment.

Environmental precautions
Do not allow to enter into surface water or drains.

Methods and material for containment and cleaning up
Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents). Collect in closed containers for disposal. Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections
Treat the recovered material as prescribed in the section on waste disposal. See protective measures under point 7 and 8.

7. Handling and storage

Precautions for safe handling

Advice on safe handling
Use only in well-ventilated areas. Keep away from sources of ignition. - No smoking.

Advice on protection against fire and explosion
Take precautionary measures against static discharge.

Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels
Keep container tightly closed and in a well-ventilated place. Keep away from sources of ignition. - No smoking. Take precautionary measures against static discharge. Suitable floor material: Solvent-proof.

Further information on storage conditions
Protect against: heat. UV-radiation/sunlight.

8. Exposure controls/personal protection

Control parameters

Additional advice on limit values
No data available

Exposure controls

Appropriate engineering controls
If handled uncovered, arrangements with local exhaust ventilation have to be used. Do not breathe.

Protective and hygiene measures
When using do not eat, drink or smoke. Protect skin by using skin protective cream. After work, wash hands and face. Immediately remove any wetted clothing, shoes or stockings.

Eye/face protection
Suitable eye protection: Tightly sealed safety glasses.

Hand protection
Tested protective gloves are to be worn:
German Industry Norms (DIN) / European Norms (EN): DIN EN 374

Duration of wearing with permanent contact:
Suitable material: FKM (fluororubber).
Thickness of glove material: 0.7 mm
penetration time (maximum wearing period): > 480 min
Recommended protective gloves brand: KCL 890 Vitoject, Manufacturer: KCL GmbH, D-36124 Eichenzell, Source of supply: www.kcl.de

Wearing time with occasional contact (splashes):
Suitable material: NBR (Nitrile rubber).
Thickness of glove material: 0.4 mm
penetration time (maximum wearing period): > 30 min

For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

Skin protection
For the protection against direct skin contact, body protective clothing is essential (in addition to the usual working clothes).

Respiratory protection
If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn. Respiratory protection necessary at: aerosol or mist generation. Filtering device (full mask or mouthpiece) with filter: A

Environmental exposure controls
Do not allow uncontrolled leakage of product into the environment.

Information on basic 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>Color:</td>
<td>colourless</td>
</tr>
<tr>
<td>Odor:</td>
<td>characteristic</td>
</tr>
<tr>
<td>pH-Value:</td>
<td>No data available</td>
</tr>
<tr>
<td>Changes in the physical state</td>
<td></td>
</tr>
<tr>
<td>Melting point/freezing point:</td>
<td>No data available</td>
</tr>
<tr>
<td>Initial boiling point and boiling range:</td>
<td>204 °C - Gamma Butyrolactone</td>
</tr>
<tr>
<td>Sublimation point:</td>
<td>No data available</td>
</tr>
<tr>
<td>Softening point:</td>
<td>No data available</td>
</tr>
<tr>
<td>Pour point:</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point:</td>
<td>&gt;70 °C - DIN EN ISO 13736</td>
</tr>
</tbody>
</table>
## Flammability

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>No data available</td>
</tr>
<tr>
<td>Gas</td>
<td>No data available</td>
</tr>
</tbody>
</table>

## Explosive properties

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower explosion limits:</td>
<td>2,7 vol. %</td>
</tr>
<tr>
<td>Upper explosion limits:</td>
<td>15,6 vol. %</td>
</tr>
<tr>
<td>Ignition temperature:</td>
<td>430 °C</td>
</tr>
</tbody>
</table>

## Auto-ignition temperature

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>No data available</td>
</tr>
<tr>
<td>Gas</td>
<td>No data available</td>
</tr>
</tbody>
</table>

## Oxidizing properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor pressure:</td>
<td>0,4 hPa</td>
</tr>
</tbody>
</table>

## Solubility in other solvents

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partition coefficient:</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity / dynamic:</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity / kinematic:</td>
<td>No data available</td>
</tr>
<tr>
<td>Flow time:</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour density:</td>
<td>No data available</td>
</tr>
<tr>
<td>Evaporation rate:</td>
<td>No data available</td>
</tr>
<tr>
<td>Solvent separation test:</td>
<td>No data available</td>
</tr>
<tr>
<td>Solvent content:</td>
<td>No data available</td>
</tr>
</tbody>
</table>

## Other information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No data available</td>
</tr>
</tbody>
</table>

## 10. Stability and reactivity

### Reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No data available</td>
</tr>
</tbody>
</table>

### Chemical stability

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability:</td>
<td>Stable</td>
</tr>
</tbody>
</table>

### Possibility of hazardous reactions

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous reactions:</td>
<td>Will not occur</td>
</tr>
</tbody>
</table>

### Conditions to avoid

- UV-radiation/sunlight.
- Keep away from heat. Ignition hazard.
- Only use the material in places where open light, fire and other flammable sources can be kept away.
- Take precautionary measures against static discharge.
Incompatible materials
- Oxidizing agents.
- Acid, concentrated.
- Alkalis (alkalis), concentrated.

Hazardous decomposition products
- Carbon monoxide.
- Carbon dioxide.

11. Toxicological information

Information on toxicological effects

Route(s) of Entry
- Inhalation, ingestion, skin contact, eye contact

Acute toxicity
There are no data available on the mixture itself.

<table>
<thead>
<tr>
<th>CAS No</th>
<th>Components</th>
<th>Exposure routes</th>
<th>Method</th>
<th>Dose</th>
<th>Species</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>96-48-0</td>
<td>Gamma Butyrolactone</td>
<td>oral</td>
<td>LD50</td>
<td>1540 mg/kg</td>
<td>Rat</td>
<td>IUCLID</td>
</tr>
<tr>
<td>108-32-7</td>
<td>propylene carbonate</td>
<td>oral</td>
<td>LD50</td>
<td>34600 mg/kg</td>
<td>Rat</td>
<td>GESTIS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dermal</td>
<td>LD50</td>
<td>&gt; 23800 mg/kg</td>
<td>Rabbit</td>
<td>GESTIS</td>
</tr>
</tbody>
</table>

Irritation and corrosivity
- Causes severe skin burns and eye damage.
  Method: Calculation method.

Sensitizing effects
- May cause an allergic skin reaction.
  Method: Calculation method.

Specific target organ toxicity (STOT) - single exposure
- May cause drowsiness or dizziness.
  Method: Calculation method.

Severe effects after repeated or prolonged exposure
There are no data available on the mixture itself.

Carcinogenic/mutagenic/toxic effects for reproduction
There are no data available on the mixture itself.

Carcinogenicity (NTP): Ingredient (name): none
Carcinogenicity (IARC): gamma-Butyrolactone (CAS 96-48-0) is listed in group 3.
Carcinogenicity (OSHA): Ingredient (name): none

Aspiration hazard
There are no data available on the mixture itself.

12. Ecological information

Ecotoxicity
There are no data available on the mixture itself.

Persistence and degradability
There are no data available on the mixture itself.

Bioaccumulative potential

There are no data available on the mixture itself.

Mobility in soil
No data available

Other adverse effects
No data available

13. Disposal considerations

Waste treatment methods

Advice on disposal

Appropriate disposal/Product: Remove according to the regulations. Consult the appropriate local waste disposal expert about waste disposal. Do not allow to enter into surface water or drains.

Contaminated packaging

Appropriate disposal/Product: Remove according to the regulations. Consult the appropriate local waste disposal expert about waste disposal.

14. Transport information

US DOT 49 CFR 172.101

UN/ID number: UN 1760
Proper shipping name: CORROSIVE LIQUID, N.O.S. (bis(p-tolyl)iodonium hexafluorophosphate)
Transport hazard class(es): 8
Packing group: II
Hazard label: 8

Marine transport (IMDG)

UN number: UN 1760
UN proper shipping name: CORROSIVE LIQUID, N.O.S. (bis(p-tolyl)iodonium hexafluorophosphate)
Transport hazard class(es): 8
Packing group: II
Hazard label: 8

Limited quantity: 1 L
Excepted quantity: E2
EmS: F-A, S-B

Air transport (ICAO)

UN number: UN 1760
UN proper shipping name: CORROSIVE LIQUID, N.O.S. (bis(p-tolyl)iodonium hexafluorophosphate)
Transport hazard class(es): 8
Packing group: II
Hazard label: 8

Limited quantity Passenger: 0.5 L
Passenger LQ: Y840
Safety Data Sheet

mr-DWL Series

Product code: A_USA_mr-DWL

Print date: 15.02.2016

Exempted quantity: E2

IATA-packing instructions - Passenger: 851
IATA-max. quantity - Passenger: 1 L
IATA-packing instructions - Cargo: 855
IATA-max. quantity - Cargo: 30 L

Environmental hazards

ENVIRONMENTALLY HAZARDOUS: no

Special precautions for user

No data available

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

not applicable

15. Regulatory information

U.S. Regulations

National Inventory TSCA

bis(p-tolyl)iodonium hexafluorophosphate - CAS 60565-88-0 - NOT LISTED
For R&D use only. Not for drug, household or other uses.

National regulatory information

SARA Section 311/312 Hazards:
- Epoxidharz (28906-96-9): Immediate (acute) health hazard
- Gamma-Butyrolacton (96-48-0): Immediate (acute) health hazard
- Propylencarbonat (108-32-7): Immediate (acute) health hazard
- bis(p-tolyl)iodonium hexafluorophosphate (60565-88-0): Immediate (acute) health hazard

State Regulations

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65, State of California)
This product contains no chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16. Other information

Hazardous Materials Information Label (HMIS)

Health: 3
Flammability: 1
Physical Hazard: 0
Personal Protection: C

NFPA Hazard Ratings

Health: 3
Flammability: 1
Reactivity: 0
Unique Hazard: /

Changes

Revision date: 12.02.2016
Revision No:
Chapter: 1, 2, 3, 4, 6, 8, 9, 10, 12, 13, 14, 15, 16

Other data

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other...
products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

(\textit{The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.})