1 Identification of the substance/mixture and of the company

· Product identifier
  · Trade name: Remover PG
  · Product number: G050200
  · Application of the substance / the mixture Photoresist remover

· Details of the supplier of the safety data sheet
  · Manufacturer/Supplier:
    MicroChem Corp.
    200 Flanders Road
    Westborough, MA 01581 USA

· Information department:
  · Information department:
    Product Safety
    Email: productsafety@microchem.com
  · Emergency telephone number:
    MicroChem Corp. : 617-965-5511
    Chemtrec USA Emergency : 800-424-9300
    Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

· Classification of the substance or mixture
  GHS08 Health hazard
  Repr. 1B H360 May damage fertility or the unborn child.

· Label elements
  · GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).
  · Hazard pictograms
    GHS07
    Skin Irrit. 2 H315 Causes skin irritation.
    Eye Irrit. 2A H319 Causes serious eye irritation.
    STOT SE 3 H335 May cause respiratory irritation.
    H227 Combustible liquid.

· Hazard determining components of labeling:
  · N-methyl-2-pyrrolidinone

· Hazard statements
  · H227 Combustible liquid.
  · H315 Causes skin irritation.
  · H319 Causes serious eye irritation.
  · H360 May damage fertility or the unborn child.

(Contd. on page 2)
3 Composition/information on ingredients

· Chemical characterization: Mixtures
· Description: Mixture of the substances listed below with nonhazardous additions.

· Dangerous components:

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4</td>
<td>N-methyl-2-pyrrolidinone</td>
<td>Repr. 1B, H360; Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335; H227</td>
</tr>
<tr>
<td></td>
<td>Proprietary Surfactant</td>
<td>Skin Irrit. 2, H315; Eye Irrit. 2, H319</td>
</tr>
</tbody>
</table>

· SVHC

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4</td>
<td>N-methyl-2-pyrrolidinone</td>
<td></td>
</tr>
</tbody>
</table>

4 First-aid measures

· Description of first aid measures
· After inhalation:
  Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
· After skin contact: Immediately wash with water and soap and rinse thoroughly.
· After eye contact:
  Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

(Contd. on page 3)
· **After swallowing:**
  Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.

· **Information for doctor:**
  · Most important symptoms and effects, both acute and delayed: No further relevant information available.
  · Indication of any immediate medical attention and special treatment needed: No further relevant information available.

### 5 Fire-fighting measures

· **Extinguishing media**
  · Suitable extinguishing agents:
    CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

· **Special hazards arising from the substance or mixture:**
  No further relevant information available.

· **Advice for firefighters**
  · Protective equipment: Wear SCBA.

### 6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
  Wear protective equipment. Keep unprotected persons away.
  Keep away from ignition sources.

· **Environmental precautions:**
  Do not allow to enter sewers/surface or ground water.

· **Methods and material for containment and cleaning up:**
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  Ensure adequate ventilation.
  Dispose contaminated material as waste according to Section 13.

· **Reference to other sections**
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

### 7 Handling and storage

· **Handling:**
  · Precautions for safe handling
    Ensure good ventilation/exhaust at the workplace.
    Open and handle container with care.
    Prevent formation of aerosols.
    Store in cool, dry place in tightly closed containers.

· **Information about protection against explosions and fires:**
  Keep respirator available.
  Keep ignition sources away - Do not smoke.

· **Conditions for safe storage, including any incompatibilities**

· **Storage:**
  · Requirements to be met by storerooms and containers:
    Store in a cool location.
    Suitable material for receptacles and pipes: steel or stainless steel.

· **Information about storage in one common storage facility:**
  Store away from oxidizing agents.

· **Further information about storage conditions:**
  Keep container tightly sealed.
Trade name: Remover PG

This product is hygroscopic.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems: No further data; see item 7.

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Component (CAS)</th>
<th>Limit Value</th>
<th>Medium</th>
<th>Time</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4 N-methyl-2-pyrrolidinone</td>
<td>10 ppm</td>
<td>Skin</td>
<td>end of shift</td>
<td>5-Hydroxy-N-methyl-2-pyrrolidone</td>
</tr>
</tbody>
</table>

Ingredients with biological limit values:

<table>
<thead>
<tr>
<th>Component (CAS)</th>
<th>Limit Value</th>
<th>Medium</th>
<th>Time</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-50-4 N-methyl-2-pyrrolidinone</td>
<td>100 mg/L</td>
<td>urine</td>
<td>end of shift</td>
<td>5-Hydroxy-N-methyl-2-pyrrolidone</td>
</tr>
</tbody>
</table>

Additional information: The lists that were valid during the creation were used as basis.

Exposure controls

Personal protective equipment:

General protective and hygienic measures:

Keep away from food and beverages.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Do not inhale gases / fumes / aerosols.
Pregnant women should strictly avoid inhalation or skin contact.

Respiratory equipment:

In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.

Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Contact glove manufacturer for break-through time.

Material of gloves Butyl rubber, BR

Penetration time of glove material Contact glove manufacturer for break-through time.

Eye protection:

Tightly sealed goggles
9 Physical and chemical properties

- **Information on basic physical and chemical properties**
  - **Form:** Liquid
  - **Color:** Clear to light yellow
  - **Odor:** Amine-like
  - **Odour threshold:** Not determined.

- **pH-value at 20 °C (68 °F):** l. basisch

- **Change in condition**
  - **Melting point/Melting range:** Undetermined.
  - **Boiling point/Boiling range:** 202 °C (396 °F)

- **Flash point:** 86 °C (187 °F)

- **Flammability (solid, gaseous):** Not applicable.

- **Ignition temperature:** 270 °C (518 °F)

- **Decomposition temperature:** Not determined.

- **Auto igniting:** Product is not selfigniting.

- **Danger of explosion:** Not determined.

- **Explosion limits:**
  - **Lower:** 1.3 Vol %
  - **Upper:** 9.5 Vol %

- **Vapor pressure at 20 °C (68 °F):** 0.39-0.43 hPa (0-0 mm Hg)

- **Density at 25 °C (77 °F):** 1.030 g/cm³ (8.595 lbs/gal)
  - **Relative density:** Not determined.
  - **Vapour density:** Not determined.
  - **Evaporation rate:** 0.03 (BuAc=1)

- **Solubility in / Miscibility with**
  - **Water:** Fully miscible.

- **Partition coefficient (n-octanol/water):** Not determined.

- **Viscosity:**
  - **Dynamic:** Not determined.
  - **Kinematic:** Not determined.

- **Other information**
  - No further relevant information available.

10 Stability and reactivity

- **Reactivity**
  - **Chemical stability:** Stable under normal use conditions
  - **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
  - **Possibility of hazardous reactions:** No dangerous reactions known.
  - **Conditions to avoid:** No further relevant information available.
  - **Incompatible materials:** Strong oxidizing agents
  - **Hazardous decomposition products:** Carbon monoxide and carbon dioxide
Nitrogen oxides

**11 Toxicological information**

- **Information on toxicological effects**
- **Acute toxicity:**

  - **LD/LC50 values that are relevant for classification:**

    | 872-50-4 N-methyl-2-pyrrolidinone |
    |-----------------------------------|
    | Oral LD50 3914 mg/kg (Rat)        |
    | Dermal LD50 8000 mg/kg (rabbit)  |
    | Inhalative LC50/4 h >5.0 mg/l (Rat) |

- **Primary irritant effect:**
  - **on the skin:** Irritant to skin and mucous membranes.
  - **on the eye:** Irritating effect.
  - **Sensitization:** No sensitizing effects known.
  - **Experience with humans:** No further relevant information available.

- **Additional toxicological information:**
  The product shows the following dangers according to internally approved calculation methods for preparations:
  - Irritant

- **Carcinogenic categories**
  - **IARC (International Agency for Research on Cancer)**
    - None of the ingredients are listed.
  - **NTP (National Toxicology Program)**
    - None of the ingredients are listed.

**12 Ecological information**

- **Toxicity**

  - **Aquatic toxicity:**

    | 872-50-4 N-methyl-2-pyrrolidinone |
    |-----------------------------------|
    | EC50/24 h >1000 mg/l (daphnia magna) |
    | LC50/96 h >500 mg/l (Leuciscus idus) |

  - **Persistence and degradability** No further relevant information available.
  - **Behavior in environmental systems:**
  - **Bioaccumulative potential** No further relevant information available.
  - **Mobility in soil** No further relevant information available.
  - **Additional ecological information:**
    - **General notes:**
      Water hazard class 1 (Self-assessment): slightly hazardous for water
      Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
  - **Results of PBT and vPvB assessment**
    - **PBT:** Not applicable.
    - **vPvB:** Not applicable.
  - **Other adverse effects** No further relevant information available.
13 Disposal considerations

- **Waste treatment methods**
  - **Recommendation:** Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system. Disposal must be made in accordance with Federal, State, and Local regulations.

- **Uncleaned packagings:**
  - **Recommendation:** Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

- **UN-Number**
  - DOT, ADR, ADN, IMDG, IATA: Not Regulated

- **UN proper shipping name**
  - DOT, ADR, ADN, IMDG, IATA: Not Regulated

- **Transport hazard class(es)**
  - DOT, ADR, ADN, IMDG, IATA: Not Regulated

- **Packing group**
  - DOT, ADR, IMDG, IATA: Not Regulated

- **Environmental hazards:**
  - Marine pollutant: No

- **Special precautions for user**
  - Not applicable.

- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**
  - Not applicable.

- **Transport/Additional information:**
  - Not Regulated

- **UN "Model Regulation":**
  - Not Regulated

15 Regulatory information

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

  - **Sara**
    - **Section 355 (extremely hazardous substances):**
      - None of the ingredients are listed.

    - **Section 313 (Specific toxic chemical listings):**
      - 872-50-4 N-methyl-2-pyrrolidinone

    - **TSCA (Toxic Substances Control Act):**
      - All ingredients are listed or comply with TSCA regulations.

    - **Proposition 65**
      - **Chemicals known to cause cancer:**
        - None of the ingredients are listed.

      - **Chemicals known to cause reproductive toxicity for females:**
        - None of the ingredients are listed.
Chemicals known to cause reproductive toxicity for males:
None of the ingredients are listed.

Chemicals known to cause developmental toxicity:
872-50-4 N-methyl-2-pyrrolidinone

Carcinogenic categories

EPA (Environmental Protection Agency)
None of the ingredients are listed.

TLV (Threshold Limit Value established by ACGIH)
None of the ingredients are listed.

NIOSH-Ca (National Institute for Occupational Safety and Health)
None of the ingredients are listed.

OSHA-Ca (Occupational Safety & Health Administration)
None of the ingredients are listed.

Massachusetts State Right To Know List
872-50-4 N-methyl-2-pyrrolidinone

New Jersey State Right To Know List
872-50-4 N-methyl-2-pyrrolidinone

Pennsylvania Hazardous Substances List
872-50-4 N-methyl-2-pyrrolidinone

California SCAQMD Rule 443.1 VOC’s:
1026 g/l; vapor pressure 0.3 mm Hg 20C

GHS label elements
The product is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms

Signal word DANGER

Hazard-determining components of labeling:
N-methyl-2-pyrrolidinone

Hazard statements
H227 Combustible liquid.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H360 May damage fertility or the unborn child.
H335 May cause respiratory irritation.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P201 Obtain special instructions before use.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use for extinction: CO2, powder or water spray.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- Department issuing MSDS: Product safety department
- Contact: Mr. Cole

Revision History:
The business address of the manufacturer in Section 1 was updated. The contact person in Section 16 was updated.

- Date of preparation / last revision: 12/16/2014 / 2
- Abbreviations and acronyms:
  - RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
  - ICAO: International Civil Aviation Organization
  - ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  - IMDG: International Maritime Code for Dangerous Goods
  - DOT: US Department of Transportation
  - IATA: International Air Transport Association
  - ACGIH: American Conference of Governmental Industrial Hygienists
  - EINECS: European Inventory of Existing Commercial Chemical Substances
  - ELINCS: European List of Notified Chemical Substances
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - NFPA: National Fire Protection Association (USA)
  - HMIS: Hazardous Materials Identification System (USA)
  - LC50: Lethal concentration, 50 percent
  - LD50: Lethal dose, 50 percent