1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: EKC865™
General Use: Posistrip® Positive Photoresist Remover
Product Description: Organic Solvent Blend
Revision and Date: Revision D, February 14, 2005

MANUFACTURER
EKC Technology, Inc.
2520 Barrington Court
Hayward, CA 94545-1133
(510) 784-9105

2. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>WT. %</th>
<th>CAS REGISTRY #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N-Methylpyrrolidone: Proprietary 872-50-4</td>
</tr>
<tr>
<td></td>
<td>N-(2-Hydroxyethyl)-2-Pyrrolidone: Proprietary 3445-11-2</td>
</tr>
</tbody>
</table>

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>EXPOSURE LIMITS 8 hrs. TWA (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA PEL</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>N-Methylpyrrolidone: None</td>
</tr>
<tr>
<td>N-(2-Hydroxyethyl)-2-Pyrrolidone: None</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Light straw colored liquid with an amine odor.
May cause eye irritation.

POTENTIAL HEALTH EFFECTS

INHALATION
May cause irritation.
EYE CONTACT
   May cause irritation.

SKIN CONTACT
   May cause irritation.

INGESTION
   Swallowing this material may cause irritation of the mouth, throat, and stomach.

REPRODUCTIVE TOXICITY
   Prolonged or repeated exposure may cause reproductive disorders and birth defects based on tests with laboratory animals.

TARGET ORGANS
   Lungs, blood, lymph nodes, testes, thymus and eyes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
   Overexposure may aggravate existing respiratory conditions or dermatitis.

CARCINOGENICITY
   National Toxicology Program (NTP): Not listed
   IARC Monographs: Not listed
   OSHA: Not listed
   ACGIH: Not listed

4. FIRST AID MEASURES

INHALATION
   Remove to fresh air.

EYE CONTACT
   Flush eyes with water. Have eyes examined and treated by a physician.

SKIN CONTACT
   Flush skin with water. If redness or irritation occurs, seek medical attention.

INGESTION
   Maintain an open airway. Consult a physician.
5. FIRE FIGHTING MEASURES

Flashpoint and Method  
>200°F (>93°C)  
Seta Flash Closed Cup (SFCC)

Flammable Limits in Air  
% by volume  
Lower: 2.2  
Upper: 12.2

Autoignition Temperature  
Not available

Extinguishing Media  
Water, foam, carbon dioxide, dry chemical

UNUSUAL FIRE AND EXPLOSION HAZARDS

None have been identified.

FIRE FIGHTING INSTRUCTIONS

Use water spray to cool containers and fire exposed surfaces. Shut off fuel to fire if possible to do so without hazard.

FIRE FIGHTING EQUIPMENT

Wear standard fire-fighting bunker gear.

HAZARDOUS COMBUSTION PRODUCTS

Carbon monoxide, nitrogen oxides

6. ACCIDENTAL RELEASE MEASURES

SPILL OR LEAK PROCEDURES

Contain spill with absorbent material. Transfer absorbent and other contaminated materials to a UN approved covered container for disposal. Consult with Federal, State, and local regulatory agencies to determine acceptable clean-up levels. Comply with Federal, State, and local regulations on reporting releases.
7. HANDLING AND STORAGE

STORAGE TEMPERATURE

Storage in a dry, well-ventilated area 40°F to 90°F (5°C to 32°C) is recommended.

GENERAL

Keep in original tightly closed containers.  
Keep away from strong oxidizing agents and acids.  
Prevent eye contact.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTION

RESPIRATORY PROTECTION

No respiratory protection is required when this material is handled under proper ventilation, such as a wet bench or fume hood. If proper ventilation is not available, use a NIOSH approved full-face respirator with canisters or cartridges specifically approved for organic vapors. Whenever cartridges or canister respirators are used, ensure the frequent changing of the filter element. Use a supplied air respirator when in doubt of the atmospheric concentration. Consult 29 CFR 1910.134 regarding use of respirators.

PROTECTIVE CLOTHING

Wear neoprene clothing, gloves, and chemical resistant boots when there is a probability of liquid contact.

EYE/FACE PROTECTION

Wear chemical goggles or safety glasses.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor Pressure</td>
<td>&lt;1 mm Hg at 70°F (21°C)</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>&gt;1 (Air = 1)</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.95-1.10</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>&lt;1 (Butyl Acetate = 1)</td>
</tr>
<tr>
<td>Solubility in Water pH</td>
<td>Complete Not applicable</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Appearance</td>
<td>Light straw color</td>
</tr>
<tr>
<td>Boiling Range</td>
<td>395-563°F (202-295°C)</td>
</tr>
<tr>
<td>Odor</td>
<td>Amine</td>
</tr>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
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</table>
10. STABILITY AND REACTIVITY

GENERAL
This product is stable at normal temperatures and conditions of storage.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID
Strong oxidizing agents, acids

HAZARDOUS DECOMPOSITION
Carbon monoxide, nitrogen oxides

HAZARDOUS POLYMERIZATION
Will not normally occur.

11. TOXICOLOGICAL INFORMATION

DATA FOR EKC865™

INHALATION
LC$_{50}$, rat (4 hr): >5.35 mg/L, the highest concentration attainable; nontoxic.

EYE CONTACT
No information is available.

SKIN CONTACT
LD$_{50}$, rabbit: >2000 mg/kg, not harmful.

INGESTION
LD$_{50}$, rat: 4097 mg/kg, not harmful.

GENOTOXICITY
Not mutagenic in bacterial cells in culture.

TARGET ORGANS
Lungs, blood, lymph nodes, testes, thymus, and eyes
DATA FOR N-METHYLPYRROLIDONE, A COMPONENT OF EKC865™:

EYE CONTACT
   Moderately irritating.

SKIN CONTACT
   Slightly irritating.

GENOTOXICITY
   Not mutagenic in bacterial cells in culture; caused chromosome damage in yeast cells.

DEVELOPMENTAL TOXICITY
   Gavage study (rabbit, days 6-18 of gestation):
      NOAEL for maternal toxicity = 55 mg/kg
      LOAEL for maternal toxicity = 175 mg/kg
      NOAEL for developmental toxicity = 175 mg/kg
      LOAEL for developmental toxicity = 540 mg/kg
      Malformations and resorptions noted; no selective effect on fetus.

   Dermal study (rat, days 6-15 of gestation):
      NOAEL for maternal toxicity = 237 mg/kg
      LOAEL for maternal toxicity = 750 mg/kg
      NOAEL for developmental toxicity = 237 mg/kg
      LOAEL for developmental toxicity = 750 mg/kg
      Embryotoxicity and malformations noted, no selective effect on fetus.

   Inhalation study (rat, 6 hr/day, days 6-15 of gestation):
      NOAEL for maternal and developmental toxicity = 0.36 mg/L, the highest level tested.

REPRODUCTION
   Dietary study (rat):
      NOAEL – 160 mg/kg
      LOAEL – 500 mg/kg
      Decreased maternal weight gain, fertility and fecundity, and embryo- and fetotoxicity noted.

SUBCHRONIC TOXICITY
   Dietary study (13 weeks, dog):
      NOAEL –= 250 mg/kg (highest dose tested)

   Inhalation study (6 hr/day for 90 days plus 4 week recovery, rat):
      NOAEL = 1 mg/L
      LOAEL = 3 mg/L
      Respiratory irritation, decreased weight gain, and effects on testes noted.

   Inhalation study (6 hr/day for 4 weeks plus 2 week recovery, rat):
      NOAEL = 0.5 mg/LL
      LOAEL = 1.0 mg/L
      Damage to lungs, blood cells, lymph nodes, and thymus noted.
DATA FOR N-METHYLPYRROLIDONE, A COMPONENT OF EKC865™ (CONT.):

Dietary study (rat, 90 days):
- NOAEL ≅ 230 mg/kg
- LOAEL ≅ 592 mg/kg
  Decreased body weight gains, liver changes, and neurobehavioral effects noted.

Dietary study (mouse, 90 days):
- NOAEL ≅ 150 mg/kg
- LOAEL ≅ 375 mg/kg
  Decreased body weight gains, liver changes, and neurobehavioral effects noted

CHRONIC TOXICITY

Inhalation study (6 hr/day for 2 years, rat):
- NOAEL – 0.4 mg/L (highest dose tested)

Dietary study (rat, 2 years):
- NOAEL ≅ 250 mg/kg
- LOAEL ≅ 750 mg/kg
  Decreased weight gain and food consumption in both sexes and decreased survival
  and increased nephropathy in males noted.

Dietary study (mouse, 18 months):
- NOAEL ≅ 284 mg/kg
- LOAEL ≅ 1244 mg/kg
  Increased liver tumors and other liver alterations in both sexes; potentially reversible
  effects on liver weight and size of liver cells at the NOAEL noted; no effects at about
  102 mg/kg.

DATA FOR N-(2-HYDROXYETHYL)-2-PYRROLIDONE, A COMPONENT OF EKC865™:

EYE CONTACT
- FHSA score: 0.8/110, practically nonirritating.

SKIN CONTACT
- Primary Irritation Index: 0.0/8.0, practically nonirritating.
  Not a primary irritant in humans; not a sensitizer except in unusual cases of atopic
  individuals

GENOTOXICITY
- Mutagenic in bacterial cells and weakly mutagenic in mammalian cells in culture; did not
  damage chromosomes in mammalian cells. Did not cause cell transformation.

TARGET ORGANS
- None have been identified.
DATA FOR N-(2-HYDROXYETHYL)-2-PYRROLIDONE, A COMPONENT OF EKC865™:

12. ECOLOGICAL INFORMATION

No data are available for EKC865™. Data for the components are summarized below.

DATA FOR N-METHYLPYRROLIDONE, A COMPONENT OF EKC865™:

FATE
Potentially biodegradable under aerobic conditions. Expected to be highly mobile in soil. It may slowly volatilize from dry soil, but is not expected to significantly evaporate from moist soil or from water. It is not expected to significantly bioconcentrate in fish and aquatic organisms. In air, it has been found to react with hydroxyl and nitrate radicals; the tropospheric lifetime is a few hours.

AQUATIC TOXICITY
- 48 hr EC50 Golden orfe: >4600<10,000 mg/L, not harmful.
- 24 hr EC50 Daphnia magna: >1000 mg/L, not harmful.
- 72 hr EC50 Algae: >500, not harmful.
- 96 hr LC50 Rainbow trout: >500 mg/L, not harmful.

DATA FOR N-(2-HYDROXYETHYL)-2-PYRROLIDONE, A COMPONENT OF EKC865™:

FATE
Very soluble in water; not expected to evaporate from water. Bioconcentration expected to be negligible. Low degree of adsorption to sediments predicted. Expected to be readily biodegradable. Rapid biodegradation predicted in soil and water with ultimate degradation occurring in weeks. Adsorption to soil predicted to be low, with significant leaching. Removal from air expected at a moderate rate by reaction with hydroxyl radicals.

AQUATIC TOXICITY
Not expected to be harmful to aquatic organisms.
13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS
Consult 40 CFR, Parts 261 and 268, state and local regulations for guidance on disposal of this product. Incineration at a facility with appropriate permits or authorizations is the recommended method of disposal.

CONTAINER DISPOSAL
Empty containers retain product residue. Observe all hazard precautions. Keep away from heat, sparks, and flames. Do not distribute, make available, or reuse empty containers except for storage and shipment of original product. Remove all hazardous product residue and puncture or otherwise destroy empty containers before disposal. Consult 40 CFR 261 and 268 for guidance on disposal.

14. TRANSPORT INFORMATION

DOT/IMO/ICAO/IATA
Proper shipping name Not Regulated

15. REGULATORY INFORMATION

TSCA (TOXIC SUBSTANCE CONTROL ACT)
Components of this product are listed on the TSCA Inventory.

PROPOSITION 65
WARNING. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
311/312 Hazard Categories Acute, chronic
313 This product is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of CFR 372.

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION AND LIABILITY ACT)
Not reportable. We recommend you contact local authorities to determine if there may be other local reporting requirements.
Because the health effects from exposure to EKC865™ have not been fully evaluated, exposure should be kept to the lowest level possible.

This material is for industrial use and should only be used under the supervision of a technically qualified individual.

**LABEL INFORMATION**

**NFPA CODES**

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>2</td>
</tr>
<tr>
<td>Fire</td>
<td>1</td>
</tr>
<tr>
<td>Reactivity</td>
<td>0</td>
</tr>
<tr>
<td>Specific Hazard</td>
<td>None</td>
</tr>
</tbody>
</table>

**REVISION SUMMARY**

Rev. D  
Revision of Section 5, 6, 7, and 8

Prepared by:  
Steven C. Dawson, CIH  
Manager, Industrial Hygiene & Health

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