EASTMAN

# Eastman EastaPure™
## electronic chemicals

MAK solvent

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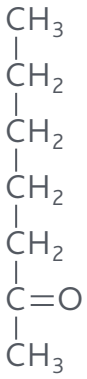
CAS: 110-43-0 (2-Heptanone)



### Chemicals for the electronics industry

EastaPure™ MAK solvent is being offered for photoresist formulations for positive-type I-line photoresist. Solvent systems are necessary for spin coating photosensitive (photoresist) materials evenly onto a silicon wafer for the semiconductor industry. This coating process is followed by drying and pattern development by lithographic processes. The multilayered patterns form the integrated circuits on the semiconductor chips. High-purity (low trace metals) specifications are required for the solvents to make acceptable semiconductor chips, and special storage and handling procedures are used to maintain these high-purity specifications. Also, key trace metals are being measured in parts-per-billion levels as seen in Table 1.

### Table 1: Special properties[a] Upper limits for trace metals

| Component | Upper Limit (parts/billion) |
|---|---|
| Aluminum (Al) | 10 |
| Barium (Ba) | 10 |
| Cadmium (Cd) | 10 |
| Calcium (Ca) | 10 |
| Chromium (Cr) | 10 |
| Cobalt (Co) | 10 |
| Copper (Cu) | 10 |
| Gallium (Ga) | 10 |
| Germanium (Ge) | 10 |
| Iron (Fe) | 10 |
| Lead (Pb) | 10 |

| Component | Upper Limit (parts/billion) |
|---|---|
| Lithium (Li) | 10 |
| Magnesium (Mg) | 10 |
| Manganese (Mn) | 10 |
| Nickel (Ni) | 10 |
| Potassium (K) | 10 |
| Silver (Ag) | 10 |
| Sodium (Na) | 10 |
| Strontium (Sr) | 10 |
| Titanium (Ti) | 10 |
| Zinc (Zn) | 10 |

[a]*Listed in the* Sales Specification.

Eastman EastaPure™ MAK solvent can also be used in the edge-bead removal processes after spin coating. In addition to the special analytical results on some key trace metals, Table 2 lists some typical properties and regulatory classifications for EastaPure™ MAK solvent.

## Table 2: Typical properties[a]

| | |
|---|---|
| Molecular weight | 114.19 |
| Assay as MAK, min.[b] | 99.0% |
| Color (Pt-Co scale), max.[b] | 5 |
| Specific gravity @ 20/20°C[b] | 0.815–0.818 |
| Water content, max.[b] | 0.05% |
| Acidity, as acetic acid[b] | 0.02% |
| Alcohol content, max.[b] | 0.2% |
| Neat viscosity, cP @ 25°C | 0.77 |
| Refractive index @ 20°C[b] | 1.406–1.409 |
| Hansen solubility parameters | |
| Nonpolar | 7.9 |
| Polar | 2.8 |
| Hydrogen bonding | 2.0 |
| Total | 8.6 |
| Boiling range @ 760 torr, °C[b] | |
| Initial | 147.0 |
| Dry point | 153.5 |
| Freezing point, °C | −33.0 |
| Flash point | |
| Tag closed cup, °C | 39.0 |
| Autoignition temperature, °C | 393.0 |
| Evaporation rate | |
| Compared to n-Butyl acetate @ 1.0 | 0.40 |
| Vapor pressure @ 20°C, mm Hg | 2.14 |
| Flammable limits in air, % by volume | |
| Lower @ 66°C | 1.11 |
| Upper @ 121°C | 7.9 |

[a]*Properties reported here are typical of average lots. Eastman makes no representation that the material in any particular shipment will conform exactly to the values given.*
[b]*Listed in the* Sales Specification.

EASTMAN

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Material Safety Data Sheets providing safety precautions, that should be observed when handling and storing Eastman products, are available online or by request. You should obtain and review the available material safety information before handling any of these products. If any materials mentioned are not Eastman products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

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