

# Product Information



## Lithography

### FEATURES

- E-beam patternable
- Negative tone
- Etch resistance
- High purity

### BENEFITS

- Direct write
- Thin films
- High resolution
- Excellent line edge roughness
- Aqueous development

### APPLICATION METHODS

- Standard spin-on deposition coating equipment.
- Typical spin-coating speeds between 1000 to 5000 rpm's.
- Hot plate exposure of 150 °C can be used to remove the solvent.

# *Dow Corning*<sup>®</sup> XR-1541 E-Beam Resist

Hydrogen silsesquioxane electron beam spin-on resist

### TYPICAL PROPERTIES

Specification Writers: Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

Property	Unit	Value
Minimal Feature Size	nm	6
Shelf Life at 5°C	months	6
Edge Definition	nm	3.3
Refractive Index	-	1.41
Trace Metals Impurities	ppb	<10
Spin-on Film Thickness - 2%	nm	30 - 60
Spin-on Film Thickness - 4%	nm	55 - 115
Spin-on Film Thickness - 6%	nm	85 - 180

## DESCRIPTION

Dow Corning XR-1541 E-Beam Resists are comprised of hydrogen silsesquioxane (HSQ) resin in a carrier solvent of methylisobutylketone (MIBK). It functions as a negative tone electron-beam resist with capability to define features as small as 6 nm. These resists are processed to high purity semiconductor grade (<10 ppb trace metals). They are available in compositions of resin in carrier solvent to produce thin films ranging in thickness of 30 to 180 nm in a single coat. Customized compositions are available upon request. Formulation with a volatile methyl siloxane (VMS) fluid blend carrier solvent is also available upon request. The VMS blend carrier solvent is exempt from United States federal and state regulations covering volatile organic compounds (VOC). High purity semiconductor grade MIBK and siloxane rinse solvents are available from Dow Corning as companion products. The line rinse solvents conform to the same purity specifications as the XR-1541 resist products.

## PROCESSING/CURING

Variable energy electron beam lithography allows control of the electron penetration depth in HSQ from below 35 nm to greater than 175 nm with a single exposure tool with beam energies from 200 eV to 100 keV. Optimal doses depend upon beam energy, desired resolution, and film thickness, but area doses from 400 to 700  $\mu\text{C}/\text{cm}^2$  are typical and dependent on thickness. A 350 °C post exposure bake in N<sub>2</sub> enhances the contrast properties of the film. Films can then be developed in a standard aqueous base developer (0.26 N TMAH).

## PACKAGING

Dow Corning® XR-1541 E-Beam Resists is available in 125-ml, and 250-ml containers

## STORAGE AND SHELF LIFE

Refer to the Sales Specifications and/or Product Label for these products. These products have a shelf life of 6 months from date of manufacture.

## PRODUCT LEVEL DESCRIPTION

Dow Corning E-beam Resists are formulated to directly write fine patterns with high resolution. Applications for the photoresists are for mask making and for next generation lithography processing.

## HEALTH AND ENVIRONMENTAL INFORMATION

To support customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Product Safety and Regulatory Compliance (PS&RC) specialists available in each area. For further information, please see our website, [www.dowcorning.com](http://www.dowcorning.com), or consult your local Dow Corning representative.

## LIMITATIONS

These products are neither tested nor represented as suitable for medical or pharmaceutical uses.

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## For More Information

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