

FILTERS FOR PHOTOLITHOGRAPHY



Bringing information to light

i-line filter capabilities

Omega® Optical offers a new generation, aftermarket i-line interference filter designed for litho tools in the photolithography process, such as LSI and LCD Steppers with high power Mercury Lamps. This high performance and environmentally stable bandpass filter resolves monochromatic wavelengths reaching the photomask substrate so that optimum resolution is achievable. Omega has designed a filter that efficiently transmits the five lines of the fine structure of the Mercury i-line with bandwidth, center wavelength, and filter construction designed to allow maximum throughput and filter life. Significant improvements have been engineered into this aftermarket filter. Omega offers custom engineered filters as well as standard i-line filters.

improvements

- The filter is manufactured using durable oxide films, which are deposited via electron beam with ion-assist, to assure stability over time and varying environmental conditions.
- Purified fused silica substrates, rather than borosilicate, are used to assure the highest optical quality and spectral stability.
- Volatile epoxies, which are the source of out-gassing and resulting degradation of intensity and/or uniformity, have been eliminated in contrast with many OEM filters.

photometric performance

Omega Optical's i-line filters are thoroughly characterized photometrically. The bandpass transmission is evaluated along 4 radii at 1/2" intervals (125 & 165mm diameter product) using a research-grade spectrophotometer. A filter with uniform bandpass characteristics across the entire surface yields the greatest intensity delivered to the resist. Our filters typically exceed intensity levels offered by OEM replacement filters by 10–20%.

product uniformity

Omega Optical manufactures i-line filters in series, dedicating evaporators solely to the narrow-band coatings required for this product. This controls key process parameters in real-time and identifies and eliminates unexpected variables. The result is a product that is consistent on a lot-to-lot basis, as well as across the surface of the individual coated filter. This manufacturing strategy results in improved deliveries and cost savings for customers due to higher coating yields.

summary

Omega Optical's new generation i-line filters feature greatly improved i-line intensity delivered to the resist, surpassing the standard OEM filters. We have refined our coating designs and developed a consistently reliable coating process, resulting in compressed delivery schedules. All filters are thoroughly characterized photometrically. In addition, all filters are qualified to the highest manufacturing standards and are packaged in a nitrogen-purged ESD bag.

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Omega Optical currently offers several optical filters for step and repeat exposure tools. Continuing **i-line filters** development will provide a complete product line of filters for photolithography applications. Call with requests for custom specifications.

Omega Part Number	Canon Part Number	Filter Type Bandpass	Size	CWL	Peak T%	Q (1/100)*	Temperature Max	Typical Lifetime (Hrs)
2009687	BN-9-7513-000	i-line filter	165mm	365.5 ± 0.6nm	≥ 82%	2-3	125° C	>10,000
2006838	BN-9-7269-000	i-line filter	124mm	365.5 ± 0.6nm	≥ 82%	2-3	125° C	>10,000
2009180	BN-9-6635-000	i-line filter FRAAAA	29.9mm	365.5 ± 1.2nm	≥ 83%	≤ 2	125° C	>10,000
2008168		g-line filter	165mm	436 ± 0.8nm	≥ 82%	2-3	125° C	>10,000
2008169		g-line filter	124mm	436 ± 0.8nm	≥ 82%	2-3	125° C	>10,000

*Note: Definition of "Q": $Q(1/100) = 1\%BW/FWHM$

Omega Optical offers mask aligner optical filters which provide improved exposures and sharper, straighter **mask aligner filters** feature walls of the SU-8 photoresist. This filter provides a nominal cut-on wavelength of 360nm, blocking shorter wavelengths and transmitting the longer wavelengths including the useful 365, 405 & 436nm mercury lines. It is 90% transparent to visible light, allowing for proper visualization of mask alignment through the filter glass.

Part Number	Filter Description	Dimensions
2007308	PL-360LP	127 x 127 x 2mm
2008110	PL-360LP	165.1 x 165.1 x 2mm
2008101	PL-360LP	171.5 x 171.5 x 2mm
2008111	PL-360LP	215.9 x 215.9 x 2mm

*Note: MicroChem recommends Omega Optical's PL-360LP optical filter for use with its SU-8 photoresist.

Specifications: Mask aligner filters are available in a variety of sizes to fit most mask aligner systems. Call with requests for custom specifications.

pricing & delivery

- Omega Optical's aftermarket photolithography optical filters are offered with superior construction and performance at a significantly lower price than standard offers.
- Delivery is typically 4-6 weeks.

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