



ILLUMINATION SYSTEM FOR SUSS MASK ALIGNERS

SUSS MO Exposure Optics®

IMPROVED LIGHT UNIFORMITY — SELF-CALIBRATING LIGHT SOURCE

For highest demands SUSS MicroTec offers the SUSS MicroOptics MO Exposure Optics system for all SUSS Mask Aligners. It provides outstanding light uniformity and allows customized illumination and source mask optimization in a mask aligner. The illumination system decouples the light from the lamp source. Small misalignments of the lamp do not affect the light uniformity anymore.

MO Exposure Optics significantly saves setup and maintenance time and guarantees optimal light exposure conditions over the full life-time of the lamp.

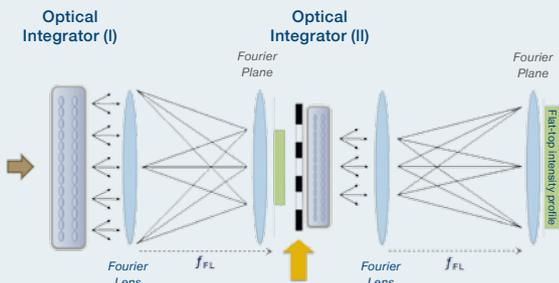
The illumination system comprises two Köhler integrators based on fused silica microlens arrays. The patented concept of two subsequent Köhler integrators allows to homogenize both the light intensity and the angular spectrum of the mask illumination. MO Exposure Optics provides telecentric illumination and thus improves the run-out for large gap illumination. Exchangeable Illumination Filter Plates (IFP) allow for a quick and easy changeover between different angular settings thereby enabling highest process flexibility. The MO Exposure Optics includes the functionality of both classical SUSS optics, HR and LGO. A changeover between both is possible in less than five minutes.

HIGHLIGHTS

- + Highest possible uniformity of $\pm 2,5\%$ or lower
- + Perfect illumination over full exposure field
- + Exposure light is decoupled from light source
- + No regular re-adjustment of lamp position required
- + Saves setup and maintenance time



TECHNOLOGY BACKBONE: MICROLENS INTEGRATORS



The optics is delivered with the three most often used IFP: „HR“, „LGO“ representation and „High Power“

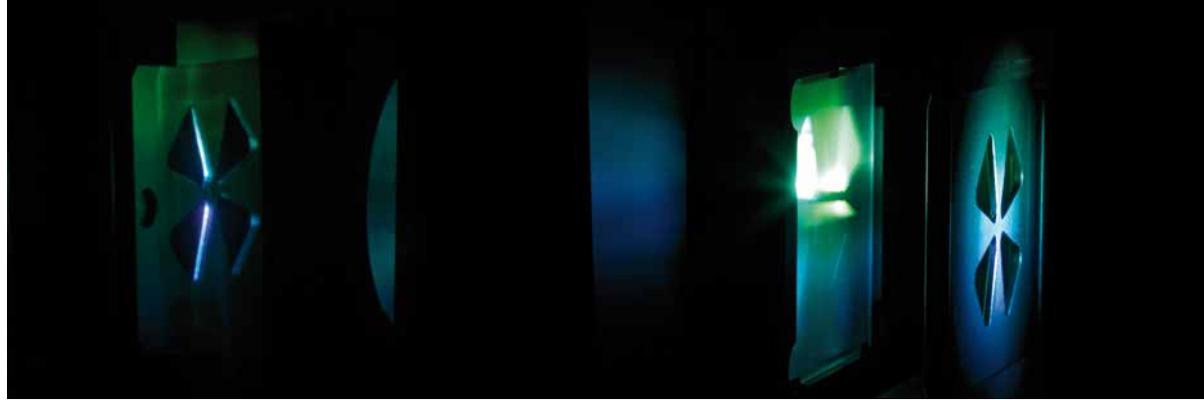
Additionally the SUSS MO Exposure Optics, in combination with the GenISys mask aligner lithography simulation software, LAB, can enhance the flexibility of the MO Exposure Optics for process window optimization and best pattern fidelity.



In cooperation with GenISys GmbH GenISys

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ILLUMINATION SYSTEM FOR SUSS MASK ALIGNERS

SUSS MO Exposure Optics®

TECHNICAL DATA



ALL IN ONE LITHOGRAPHY SIMULATION SOFTWARE

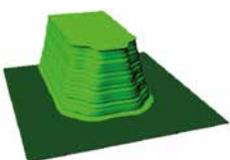
specially adapted for SUSS Mask Aligners

LAB provides all the required simulation functions for design and process development, verification and optimization:

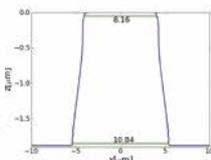
- + Models any proximity lithography equipment (mask aligner, FPD exposure tool)
- + Dedicated for all SUSS mask aligner optics including special settings for SUSS MO Exposure Optics
- + Enables to optimize illumination filter plate (IFP) design for MO Exposure Optics
- + Broadband spectrum, collimation angle and complex source shapes, large gaps, arbitrary mask layouts (including gray tone and phase shift), any substrate material, coatings, thick resist
- + Fast and accurate calculation of aerial image, bulk image in the resist, PAC concentrations, resist profiles based on threshold or 3D Mack development model
- + Fast and flexible 1D, 2D and 3D visualization, metrology and matrix viewing



Mask layout optimization to improve process window for proximity gap and dose.



Simulated resist profile (3D and cross section)



Printed resist profile with measured line width

GENERAL FEATURES

Light Uniformity	≤ 2,5% over full mask field
Light Source Stability	No regular re-alignment of lamp necessary in operation Excellent uniformity over full life-time of lamp No lamp alignment after lamp exchange
Light Intensity	Availability of high power IFP with up to 25% more intensity at reduced resolution specs
Customized Illumination	IFP change typically in less than 5 minutes Library of IFPs included (see below)TMask
Mask Aligner Types	All SUSS Mask Aligners

MO EXPOSURE OPTICS SYSTEM

Microlens Arrays	Highly transparent fused silica (DUV Quality) Anti-reflection coating Manufactured by SUSS MicroOptics
Mechanical Holders	Fit to standard SUSS Mask Aligners

WAVELENGTH RANGE

Wavelength Range	MO Exposure Optics is «DUV Ready Broadband (240 nm - 450 nm)
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LIBRARY OF ILLUMINATION FILTER PLATES (IFP)

Standard SUSS Optics	IFP-HR-, IFP-LGO-, IFP High Power
Customized IFPs	Available on request

SPECIALS, CUSTOMIZED SOLUTIONS

Down-Sizing Kits	Reduction of exposure area, increase of intensity MA150 to 4", 3"
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IFP SOLUTIONS FOR SPECIAL REQUIREMENTS

IFP for Lines	Quadrupole, Maltese (0°, 45°)
IFP for Holes, Posts	IFP-Ring 22, 30
IFP for Squares, Rectangles	IFP-Square

CUSTOMIZED SOLUTIONS

Source-Mask Optimization

Data, design and specification depend on individual process conditions and can vary according to equipment configurations. Not all specifications may be valid simultaneously. Illustrations, photos and specifications in this brochure are not legally binding. SUSS MicroTec reserves the right to change machine specifications without prior notice.



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