Photolithography

Innovative Products
for Semiconductor Processes

Wafer Handling & Automation / Wet Process & CMP / Photolithography & Thin Film

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Contents

“

Excellent performance in creating micro structures

”

System Comparison

Brand	POLOS	POLOS	4PICO	4PICO	4PICO	4PICO
Model	**MicroWriter**	**MicroPrinter**	**MicroMaster**	**PM-100**	**PM-150**	**PM-200**
PC with software	Included					
Resolution	6 µm to 15 µm	2 µm to 23 µm	0.8 - 1.5 - 2.5 µm 5 µm option	0.3 - 0.6 - 0.9 µm 5 µm option		
Max substrate size	100 x 100 mm				150 x 150mm	230 x 230 mm
Max exposed area	100 x 92 mm	75 x 75 mm	110 x 110 mm		160 x 160 mm	200 x 200 mm
Max layer thickness	100 µm	120 µm	Few microns			
Light-Source Wavelentgh	405 nm (375 nm option)	435 nm	405 nm (375 nm option)			
Optional Light-Source Wavelentgh	375 nm	N/A	375 nm			
Auto-Focus wavelength	N/A manual multiple spot focusing via plane/bilinear mapping	525 nm	650 nm			
Grayscale levels	No grayscale	256	4095			
Light-Source Lifetime	> 10.000 hours	3 900 hour lamps	> 20.000 hours			
Alignment	N/A	Topside/bsa				
Alignment resolution	5 µm	1 µm	0.5 µm			
Writing speed	100 - 120 mm/s	Prints the full substrate from few seconds to several minutes.	200 mm/s			
Writing speeds @ highest res.	1.7 mm^2/min		4 mm^2/min	1.4 mm^2/min		
Writing speeds @ lowest res.	21.2mm^2/min		35 mm^2/min			
File Format	PNG, GDSII	BMP, GDSII, DXF	BMP, TIFF, GDSII, CIF, DXF			
Dimensions (W x D x H) in mm	510 x 360 x 455	360 x 360 x 600	580 x 600 x 708	600 x 600 x 750	1263 x 1297 x 1537	880 x 1190 x 1580
Weight	20 kg	40 kg	260 kg		700 kg	
Facilities	Only electricity		Electricity & compressed air. Vacuum pump included.			
Room Temp. Regulation needs	Max 3 °C fluctuation during writing	Not needed	+/- 1 °C			
Warranty	1 year					
Warranty option	N/A	+2 years	1 year			

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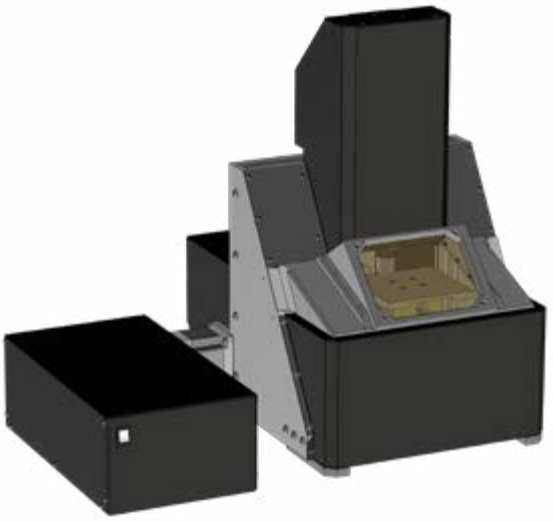
POLOS MicroWriter

The POLOS MicroWriter is a low cost direct optical lithography system oriented to universities and research facilities looking to expand their capabilities.

Technical specifications POLOS MicroWriter

XY Stage	
Typical writing speed	100 - 120 mm/s
Maximum area	100 x 92 mm^2
Mech. short range noise on slow and on fast axis	< 1 µm
Realistic minimum feature size	6 - 15 µm depending on the feature
Software	
Supported formats	PNG, GDSII
In-software transformations	Rotation, reflection, inversion, rescaling, add border



- Multiple designs from different files can be written in one process
- Tilted/warped substrate compensation via 3-point focus or 4-point bilinear measurement
- Mesh type calibration for full-bed curvature

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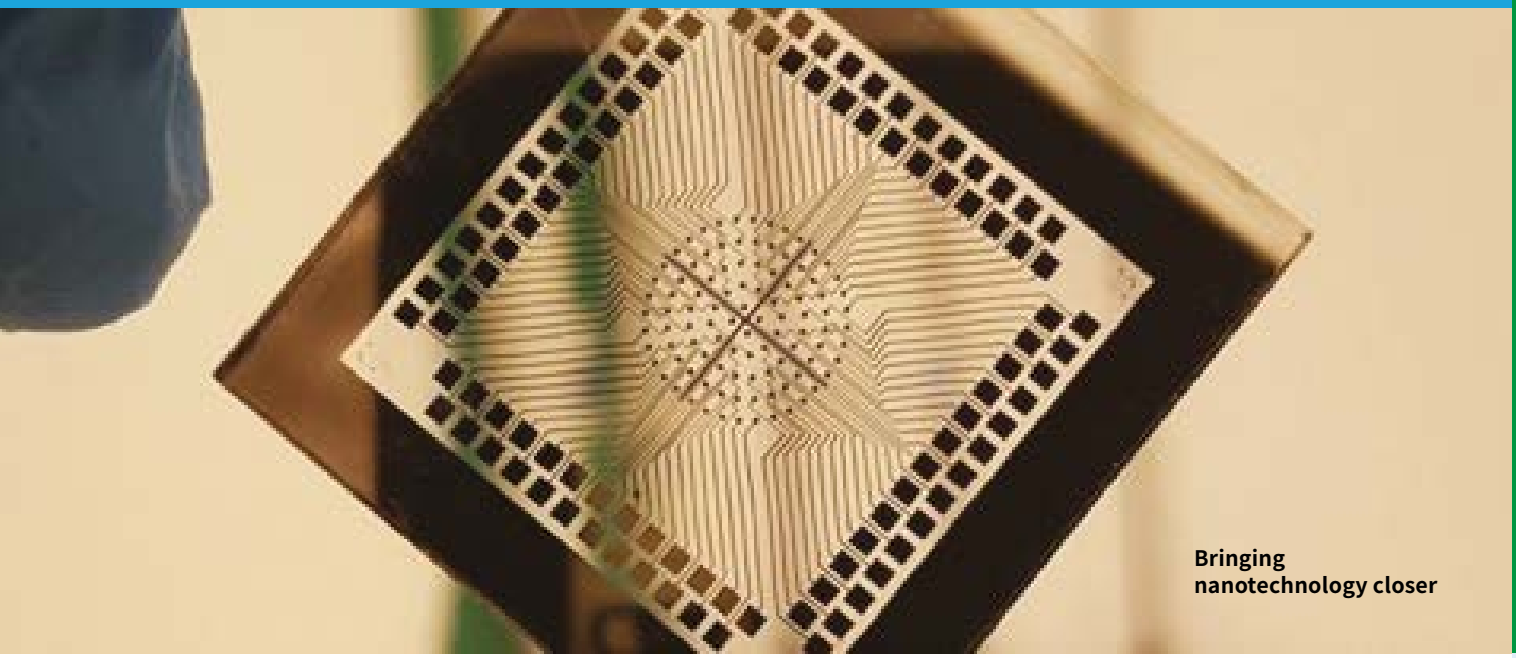


Bringing nanotechnology closer

Optics POLOS MicroWriter

Recommended raster step of included objectives	
Fine (40x NA0.65)	0.8 µm
Medium (10x NA0.25)	2 µm
Coarse (4x NA0.1)	5 µm
Effective writing speed of included objectives on big areas (unidirectional writing)	
Fine	1.7 mm^2/min
Medium	4.25 mm^2/min
Coarse	10.6 mm^2/min

- Confocal microscope for laser focusing, aligning and inspection
- Secondary independent yellow illumination

Bigger numerical aperture of the objective means:
- Smaller spot
- Smaller depth of field
- Higher resolution
- Walls end up less vertical
- Flatness of the substrate is more critical.

The best resolution is obtained with a thin photoresist with high contrast like AZ1512HS. We also use microposit S1800.

POLOS MicroPrinter

The POLOS MicroPrinter is a maskless lithography device for rapid prototyping, based on µLCD projection technology, compatible with a wide range of resists and substrates. Our system can produce any 2D shapes at micron resolution without the need for a hardmask.

Technical specifications POLOS MicroPrinter

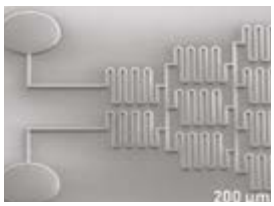
Micro-fabrication system	
Light source	Exposure: 435 nm Alignment: 525 nm
Minimum feature size	Adjustable from 2 to 23 µm
Alignment resolution	Down to 1 µm/cm^2
Maximum exposure area	75 x 75 mm^2
Substrate size	Up to 4” wafers
System dimensions	W: (36 cm); D: (36 cm); H: (60 cm)

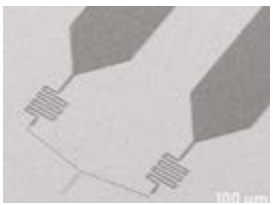
Key features

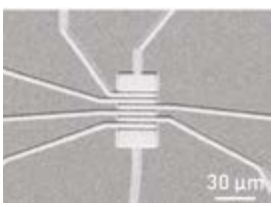
- Writing resolution down to 2 µm
- Adjustable writing field and resolution with exchangeable objectives
- Compatible with CAD files and bitmap images
- Compatible with g-line photoresists
- Compatible with a wide range of substrates (silicon, glass, metal, plastic etc.)
- Compatible with any sample size up to 4” wafer
- Camera feedback for alignment steps

Key benefits

- Time and money saving thanks to the absence of a hardmask
- Intuitive alignment method with a direct overlay of the design on the sample
- Table-top, with a very small footprint
- Technology well suited for microelectronics, 2D-materials, microfluidics, optoelectronics, optics or any other 2D micro-fabrication applications







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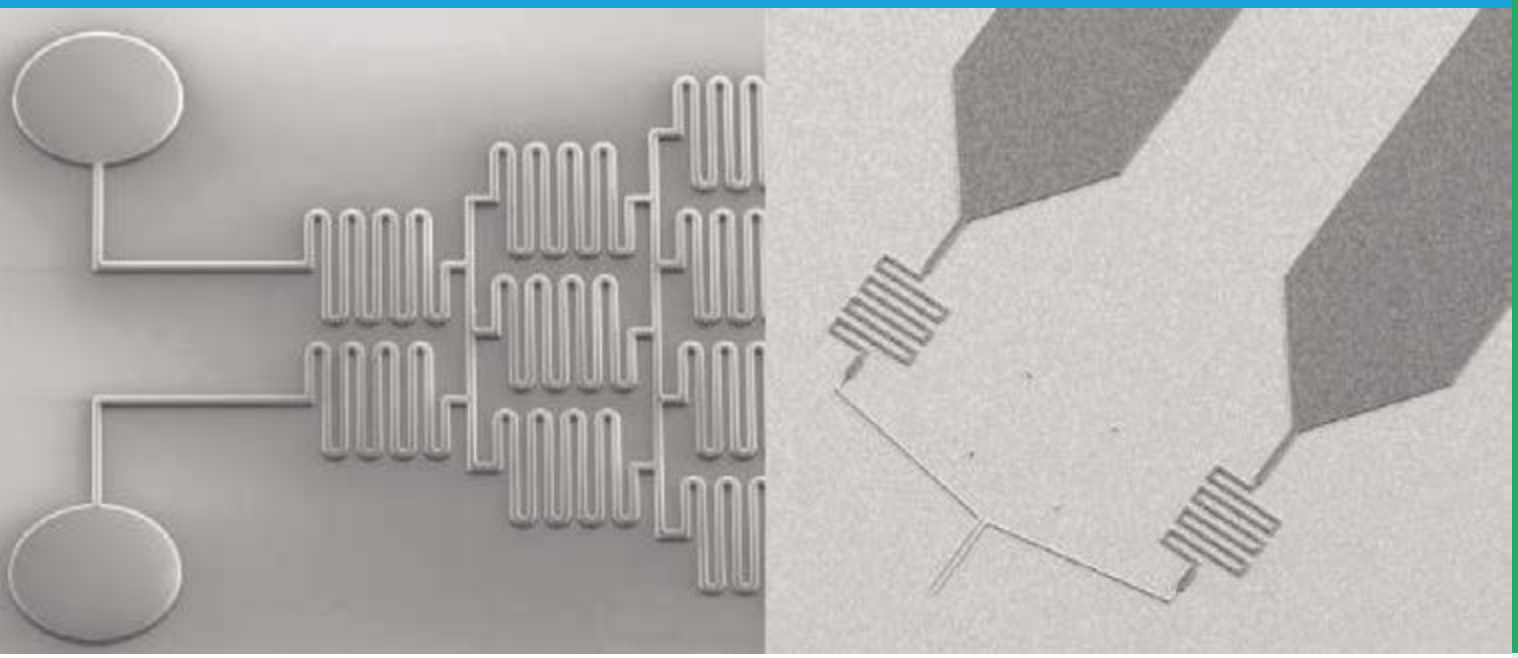


Software package	
All-in-one PC	With Windows 10, 24” full HD
SFTprint software	Machine control, step-and-repeat, automatic dose test, stitching, alignment
SFTconverter	Conversion of standard formats (gdsii, dxf, cif, oas) to bitmap images. CAD software included

Options and accessories

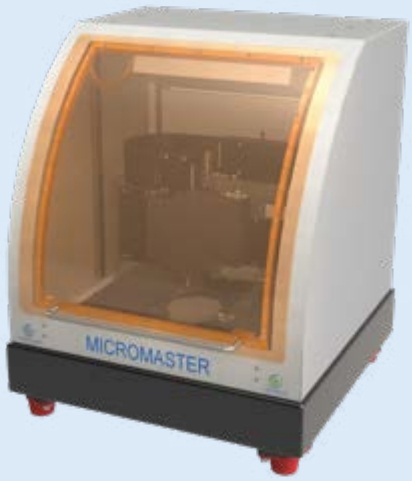
- Multiple-sample holder (glass-slide, 4” wafer etc.)
- Objectives (see below)
- Manual or motorized Z stage with tilt correction
- Manual rotation stage (360°)

Optics POLOS MicroPrinter

Objective	1X	2.5X	5X	10X
Writing field (mm)	13.6 x 7.7	5.4 x 3.0	2.7x 1.5	1.35 x 0.75
Smallest feature (µm)	23	8	4	2

MicroMaster

The MicroMaster is a versatile UV laser writer with high precision components specifically designed to give the user the highest degree of freedom to create microstructures in photosensitive layers. The MicroMaster includes a 405 nm optical module capable of writing structures as small as 0.8 µm in photoresist layers.



This user-friendly tool supports up to 4095 levels of grayscale or pure binary mode and allows for 2.5D optical structures, surface structures as well as mask projects. Real-time laser-controlled autofocus and laser intensity control ensure high-quality imaging during the entire exposure process. The control electronics are all mounted within the frame, except for the control PC. This Microsoft Windows-based desktop PC and all required software is included in the package.

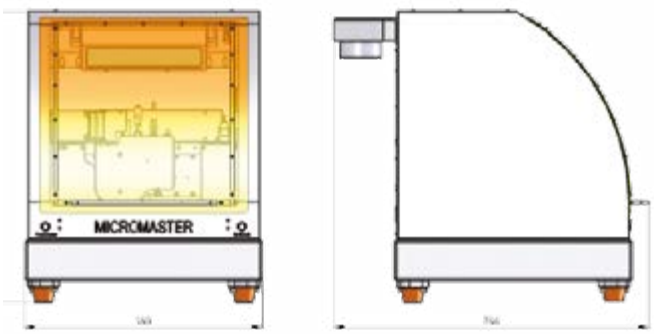
Item	Specifications
Max. writeable size	4 x 4”
Stroke scan & step	Max. 115 mm
Repeatability	< 50 nm RMS
Encoder resolution	2.5 nm
Scan speed	Max. 200 mm/s
Straightness axis	< 1 µm over 100 mm
Wafer thickness	0 - 10 mm
Max. substrate size	Min. 5 x 5 mm, max. 125 x 125 mm
Exposable area	Max. 110 x 110 mm (speed dependent)

Benefits

- High quality, cost-efficient maskless lithography tool
- 375 nm source available for i-Line resists
- Market conform 0.8 µm resolution
- Compact optical module: use a spare optical unit for revolutionary machine downtime reduction
- User-friendly operation

Dimensions

- Width: 580 mm
- Height: 708 mm
- Depth: 600 mm (not including optional air duct)
- Weight: 260 kg
- Compressed air: 5 - 7 Bar, Air quality according ISO8573-1:2010 class 3 or better.



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PicoMaster 100

The PicoMaster 100 is a versatile UV laser writer with ultra-high precision components, specifically designed to give the user the highest degree of freedom to create micro-structures in photo sensitive layers.

The PicoMaster 100 system includes a 405 nm optical module capable of writing structures as small as 300 nm in photo resist layers. This user-friendly tool supports up to 4095 levels of gray-scale or pure binary mode and allows for 3D optical structures, surface structures as well as mask projects. Real time laser controlled auto-focus and laser intensity control ensure high quality imaging during the entire exposure process. The control electronics are all mounted within the frame except for the control PC. This Microsoft Windows based desktop PC and all required software is included in the package.

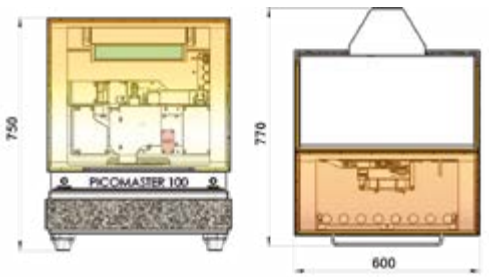
Item	Specifications
Max. writeable size	4 x 4”
Stroke scan & step	Max. 115 mm
Repeatability	< 40 nm
Encoder resolution	2.5 nm
Scan speed	Max. 200 mm/s
Straightness axis	< 0.5 µm over 105 mm
Wafer thickness	0 - 10 mm
Max. substrate size	Min. 5 x 5 mm, max. 110 x 110 mm
Exposable area	Max. 105 x 105 mm (speed dependent)

Benefits

- Highest resolution on the market with 405 nm laser
- 375 nm source available for more demanding applications
- Minimal maintenance costs
- Compact optical module: use a spare optical unit for revolutionary machine downtime reduction
- User-friendly operation

Dimensions

- Width: 600 mm
- Height: 750 mm
- Depth: 600 mm (not including optional air duct)
- Weight: 260 kg
- Compressed air: 57 Bar, Air quality according ISO8573-1:2010 class 3 or better.



PicoMaster 150

The PicoMaster is a versatile UV laser writer with ultra-high precision components, specifically designed to give the user the highest degree of freedom to create micro-structures in photo sensitive layers. The PicoMaster 150 is a stand-alone system. All components are enclosed, including control rack, vacuum pump and control PC.

This allows for quick and easy installation. A touch screen for operating the machine is attached to the frame. The system includes a 405 nm optical module capable of writing structures as small as 300 nm in photoresist layers. This user-friendly tool supports up to 4095 levels of gray-scale or pure binary mode and allows for 3D optical structures, surface structures as well as mask projects. Real time laser controlled auto-focus and laser intensity control ensure high quality imaging during the entire exposure process.

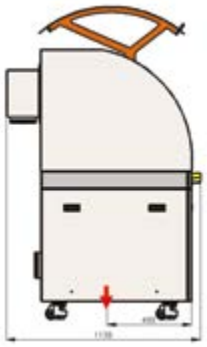
Item	Specifications
Max. writeable size	6 x 6”
Stroke scan & step	Max. 175 mm
Repeatability	< 20 nm RMS
Encoder resolution	2 nm
Scan speed	Max. 300 mm/s
Straightness axis	< 1 µm over 230 mm
Wafer thickness	0 - 10 mm
Max. substrate size	Min. 7 x 7 mm, max. 160 x 160 mm
Exposable area	Max. 150 x 150 mm (speed dependent)

Benefits

- Highest resolution on the market with 405 nm laser
- High quality tool & high quality output
- Minimal maintenance costs
- Compact optical module: use a spare optical unit for revolutionary machine downtime reduction
- User-friendly operation

Dimensions

- Width fixed screen: 1260 mm
  Without screen 860 mm
- Height: To ceiling: 2065 mm
- Depth: 1297 mm
- Weight: 700 kg
- Compressed air: 5 - 7 Bar, Air quality according ISO8573-1:2010 class 3 or better.



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PicoMaster 200

The PicoMaster is a versatile UV laser writer with ultra-high precision components, specifically designed to give the user the highest degree of freedom to create micro-structures in photo sensitive layers. The PicoMaster 200 is a stand alone-system. All components are enclosed, including control rack, vacuum pump and control PC.

This allows for quick and easy installation. A touch screen for operating the machine is attached to the frame. The system includes a 405 nm optical module capable of writing structures as small as 300 nm in photoresist layers. This user-friendly tool supports up to 4095 levels of gray-scale or pure binary mode and allows for 3D optical structures, surface structures as well as mask projects. Real time laser controlled auto-focus and laser intensity control ensure high quality imaging during the entire exposure process.

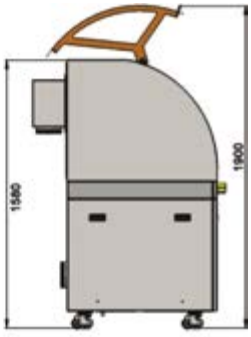
Item	Specifications
Max. writeable size	8 x 8”
Stroke scan & step	Max. 230 mm
Repeatability	< 20 nm
Encoder resolution	2 nm
Scan speed	Max. 400 mm/s
Straightness axis	< 1 µm over 230 mm
Wafer thickness	0 - 10 mm
Max. substrate size	Min. 9 x 9 mm, max. 220 x 220 mm
Exposable Area	Max. 150 x 150 mm (speed dependent)

Benefits

- Highest resolution on the market with 405 nm laser
- High quality tool & high quality output
- Minimal maintenance costs
- Compact optical module: use a spare optical unit for revolutionary machine downtime reduction
- User-friendly operation

Dimensions

- Width fixed screen: 1260 mm.
  Without screen 860 mm
- Height: To ceiling: 2065 mm
- Depth: 1297 mm
- Weight: 700 kg
- Compressed air: 5 -7 Bar, Air quality according ISO8573-1:2010 class 3 or better.



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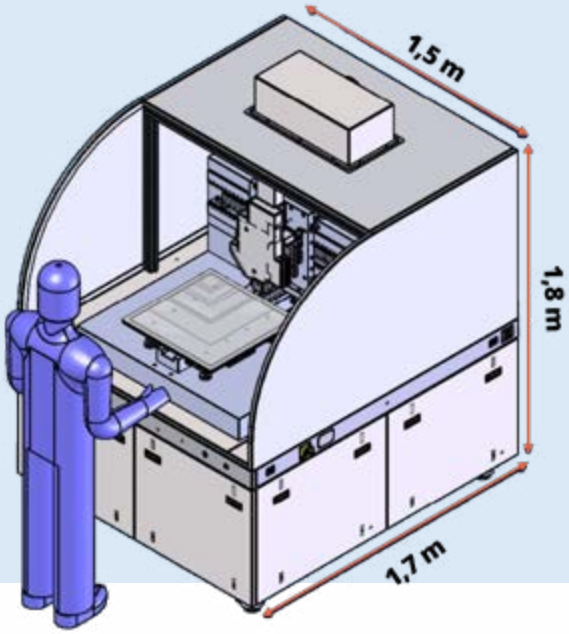
PicoMaster 500

AVAILABLE SOON



Preliminary specifications

- Up to 500 x 500 mm substrates
- 0.6 µm resolution
- 200 mm²/min write speed
- Integrated Fan Filter Unit
- Water cooler based temperature controller
- Weight: approx. 1800 kg
- Internal closed circuit water cooling
- Filter Fan Unit. No Airco required.
- Fully enclosed system (orange window)
- Supports multiple substrate sizes

Technology comparison PicoMaster systems

PicoMaster 100/200	PicoMaster 500
Single laser spot	Grating Light Valve
300 nm line width per scan	150 µm stripe width per scan
Max Scan speed: 400 mm/sec	Up to 1800 pixels per stripe
Data rate: 160 Mbit/sec	Max scan speed: 25 mm/sec
100 x 100 mm (4 x 4”) total write time @ 0.6 µm: 40 Hours	Data rate: 6 GBit/sec
	100 x 100 mm (4 x 4”) total write time @ 0.6 µm: < 1 Hours

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“Smallest high-quality focused laser beam spot available in the market”

Mask Aligner systems

MIDAS develops and produces Mask Aligners required by laboratories and companies related to semiconductor, MEMS, Bio element and Nano Technologies for more than 20 years.

We have different systems: from entry-level low cost 4” & 6” LED (& Broadband) systems, to a full range of systems from 4” to 12” broadband NUV and DUV, manual to fully robotic, large scale FPD and custom engineered systems.

The mask aligners for wafers are applicable for various fields and at present utilized in board fields such as: the research and production of semiconductors, MEMS applications, research on bio chips and Nano technologies.

	MDA-400LJ	MDA-400M	MDA-400M-6	MDA-600S
Type	Fully manual	Fully manual	PC / PLC control Manual	PC control semi auto
Mask size	Up to 5” x 5”	Up to 5” x 5”	Up to 7” x 7”	Up to 7” x 7”
Substrate size	Piece to 4” Ø	Piece to 4” Ø	Piece to 6” Ø	Piece to 6” Ø
UV lamp & power	UV-LED	350 W	350 W	350 W
Uniform beam size	125 mm Ø	4.25” x 4.25”	6.25” x 6.25”	6.25” x 6.25”
Beam uniformity	< ± 3 %	< ± 3 %	< ± 3 %	< ± 5 %
Beam wavelength	365 nm only	350 ~ 450 nm	350 ~ 450 nm	350 ~ 450 nm
365nm Intensity	~20 mW/cm²	~30 mW/cm²	~25 mW/cm²	~25 mW/cm²
Alignment accuracy	1 µm	1 µm	1 µm	1 µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact	1 µm @ 1 µm PR thickness with vacuum contact	1 µm @ 1 µm PR thickness with vacuum contact	1 µm @ 1 µm PR thickness with vacuum contact
Process mode	Soft, hard, vacuum contact & proximity	Soft, hard, vacuum contact & proximity	Soft, hard, vacuum contact & proximity	Soft, hard, vacuum contact & proximity
Substrate chuck moving	X, Y, Z & θ	X, Y, Z & θ	X, Y, Z & θ	X, Y, Z & θ
Options	Anti-Vibration table UV Intensity meter	Anti-Vibration table UV Intensity meter	Anti-Vibration table IR BSA UV Intensity meter	Anti-Vibration table CCD BSA UV Intensity meter UV-LED (365 nm) exposure module

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The MIDAS MDA-series bench top mask aligners requires minimal cleanroom space and are capable of 1 micron resolution or better and alignment precision. Auto levelling of mask and sample is a standard feature. The MDA aligners feature a dependable UV light source (optional: UV-LED), for collimated UV light in NUV or DUV.

- Easy operation & installation
- PC operation with PLC control
- Image grab & data log
- More than 100 program recipes

Easily develop your process on small substrates, pieces or wafers up to 8". The Midas mask aligner is widely used for MEMS and optoelectronics applications, such as LED production. Special configurations for nonstandard substrates such as hybrids and high-frequency components for fragile III-V materials.

Are you handling Taiko wafers? We make a special aligner for handling Taiko wafers.

	MDA-80MS	MDA-12SA	MDA-60FA	MDA-12FA
Type	PC control Semi auto	PC control Semi auto	Fully automatic	Fully automatic
Mask size	Up to 9" x 9"	Up to 14" x 14"	Up to 7" x 7"	Up to 14" x 14"
Substrate size	Piece to 8" x 8"	Piece to 8" x 8"	4" ~ 6"	8" ~ 12"
UV lamp & power	1 kW	2 kW / 5 kW	350 W / 500 W	2 kW / 5 kW
Uniform beam size	9.25" x 9.25"	14.25" x 14.25"	6.25" x 6.25"	14.25" x 14.25"
Beam uniformity	3,5 %	5 %	3 %	5 %
Beam wavelength	350 ~ 450 nm	350 ~ 450 nm	350 ~ 450 nm	350 ~ 450 nm
365nm Intensity	20 ~ 30mW/cm²	20 ~ 70 mW/cm²	20 ~ 30 mW/cm²	20 ~ 70 mW/cm²
Alignment accuracy	1 µm	1 µm	0.5 µm	0.5 µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact	1 µm @ 1 µm PR thickness with vacuum contact	1 µm @ 1 µm PR thickness with vacuum contact	1 µm @ 1 µm PR thickness with vacuum contact
Process mode	Soft, hard, vacuum contact & proximity	Soft, hard, vacuum contact & proximity	Soft, hard, vacuum contact & proximity	Soft, hard, vacuum contact & proximity
Substrate chuck moving	X, Y (manual), Z, θ (motorized)	X, Y, Z & θ (motorized)	X, Y, Z & θ (motorized)	X, Y, Z & θ (motorized)
Options	CCD BSA UV Intensity meter	CCD BSA UV Intensity meter	CCD BSA UV Intensity meter	CCD BSA UV Intensity meter
Frame	Anti-Vibration system	Anti-Vibration system	Anti-Vibration system	Anti-Vibration system
Pre-aligner			±50 µm	±50 µm

We support training and initial testing with a range of resists and developers, and sample wafers. Do not hesitate to contact us for more information and all available options!

4” UV LED Mask Aligner

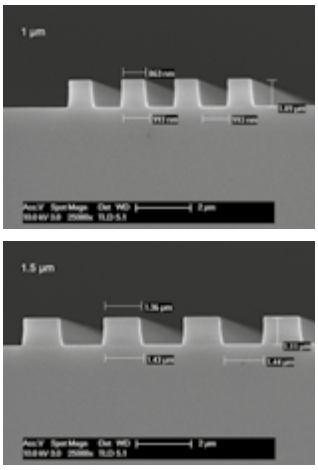
The MDA-400LJ is a mask aligner specially designed for university and research institutes. The system is equipped with a maintenance-free 365 nm LED light source (50,000 hours lifetime) and therefore ideal for resist processing.

Mask aligners with UV light mask light sources use significantly less energy compared to conventional mercury vapor lamps. The lights of the Midas mask aligner series do not need to warm-up and cool-down. No need for the cooling fan, filters or shutter. The LED light source is only switched on during the actual exposure process. LED masks have a much longer life-time. In terms of health, safety and environmental protection, the LED technology provides a significant improvement in mask alignment.

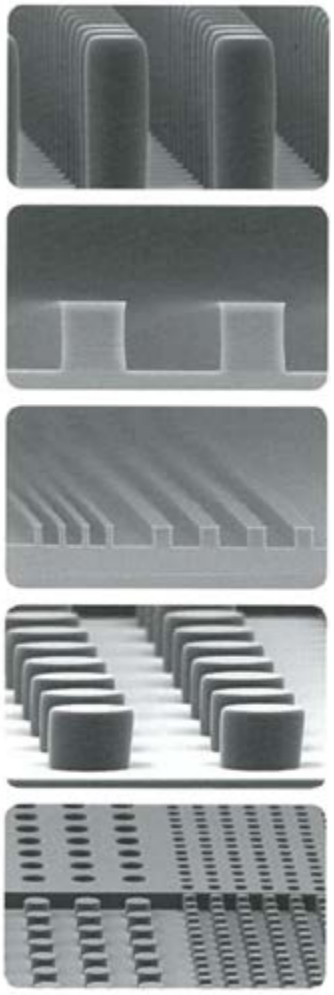
Options

- Anti-Vibration table
- UV Intensity Meter
- UV-LED (365 nm) Exposure Module

Item	Specifications
Substrate size	Up to 4” also available for 6”
Light source	UV LED
Resolution	1 µm with 1 µm thin PR @ Si Wafer
Alignment accuracy	± 1 µm
I-line beam intensity	About 10 mW/cm^2
Process mode	Soft, Hard, Vacuum contact & Proximity



SEM 1 µm high pattern, generated with DPR-i5500 Photo resist, processed MDA400LJ with the UV LED lightsource.



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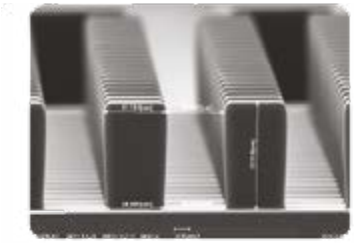
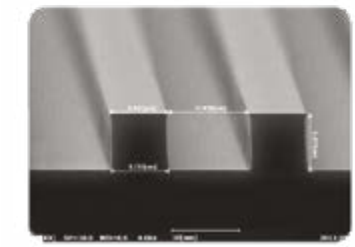
4” Manual Mask Aligner

Our manual control MDA-400M series standard feature UV Light source 350 nm to 450 nm, 365 nm Intensity: 20-30 mW/cm2 and a beam size of 6.25” x 6.25” (3 % beam uniformity for 4” wafers) and automatic exposure system. The unit comes with a Dual CCD zoom microscope with 19” LCD monitor: magnification; 5X-20X digital CCD.

Contact modes include Soft, Vacuum Hard and Proximity.
The Vacuum and Hard Contact are adjustable with an alignment accuracy of <1.0 micron.





Options

- Anti-Vibration table
- UV Intensity Meter
- UV-LED (365 nm) Exposure Module

Item	Specifications
Substrate size	Up to 4” (also available for 6”)
Light source	350 W
Resolution	1 µm with 1 µm thin PR @ Si Wafer
Alignment accuracy	± 1 µm
365nm beam intensity	> max. 30 mW/cm^2
Process mode	Soft, Hard, Vacuum contact & Proximity

6” UV LED Mask Aligner

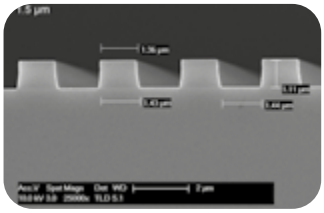
This mask aligner is specially designed for university and research institutes. The system is equipped with a maintenance-free 365 nm LED light source (50,000 hours lifetime) and therefore ideal for resist processing.

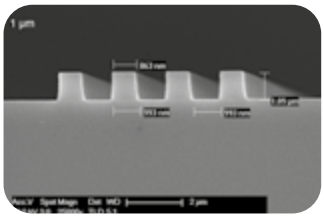
Mask aligners with UV light mask light sources use significantly less energy compared to conventional mercury vapor lamps. The lights of the Midas mask aligner series do not need to warm-up and cool-down. No need for the cooling fan, filters or shutter. The LED light source is only switched on during the actual exposure process. LED masks have a much longer life-time. In terms of health, safety and environmental protection, the LED technology provides a significant improvement in the mask alignment.

Options

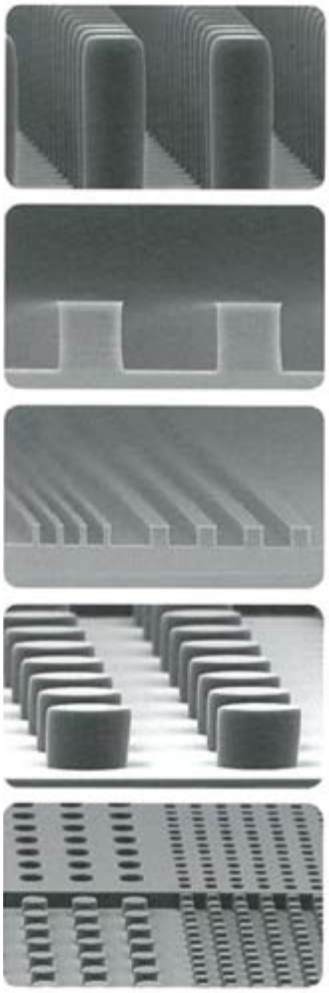
- Anti-Vibration table
- UV Intensity Meter
- UV-LED (365 nm) Exposure Module

Item	Specifications
Substrate Size	Up to 6”
Light Source	UV LED
Resolution	1 µm on 1 µm thin photo resist on a Si wafer
Alignment Accuracy	± 1 µm
I-Line Beam Intensity	About 10 mW/cm²
Process Mode	Soft, Hard, Vacuum contact & Proximity





SEM 1 µm high pattern, generated with PR-i5500 Photo resist, processed MDA400LJ with the UV LED lightsource.



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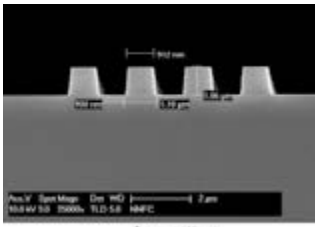
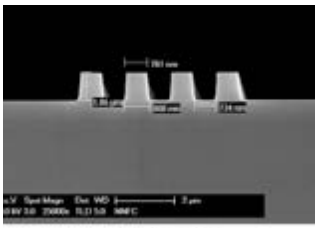
6” Semi Automatic Mask Aligner

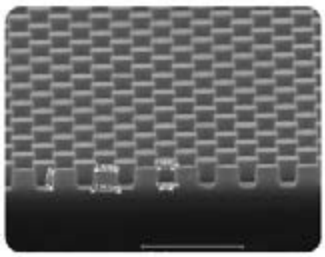
For users of both thick high aspect ratio photoresists and thin high resolution photoresists: The MDA-600S can process from 0.8 um and high aspect ratio PR to approximately 170 um thickness without additional optics. That should suit users varying needs, without any system changes.

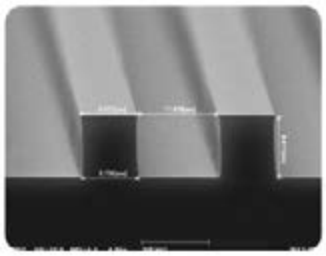
The Model MDA-600S is a semi automatic bench top mask aligner that requires only a square meter of your cleanroom space. (1256 x 1151 x 1600 mm (W*D*H)). It offers an economic alternative for R&D, or small-scale pilot production. It has a semi automatic mask aligner system for 6” features auto exposure, leveling and Z-axis stage motion.
The loading, unloading and aligning of your wafer is done manually.

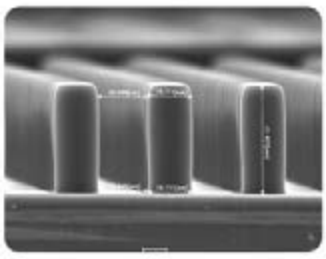
The alignment module incorporates micrometers for X, Y, and Z-axis. Alignment accuracy is ± 0.5 µm. This mask aligner is a flexible, economic solution for any entry-level mask alignment and UV exposure application.











SEM 1 & SEM 2 reference. For reference the depth of field is 0.24 ~ 0.02 mm.

Options

- Back-side Alignment Module (CCD camera) (Optional CCD Optical BSA uses CCD camera only!)
- Nanoimprint Kit

Item	Specifications
Substrate size	Up to 6” (also available for 8”)
Light source	350 W
Resolution	0.8 µm with 1 µm thin PR @ Si Wafer
Alignment accuracy	< 1 µm
365 nm beam intensity	> max. 30 mW/cm^2
Process mode	Soft, hard, vacuum contact & proximity

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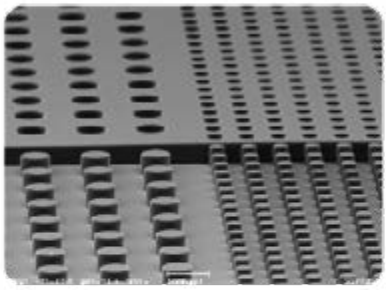
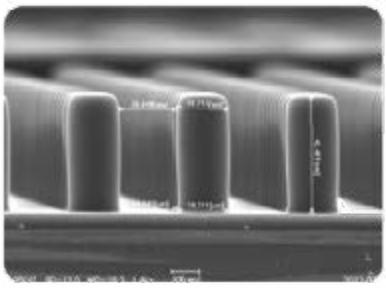
8” Semi Automatic Mask Aligners

Semi automatic mask aligner MDA-80MS
- Easy operation & Installation
- PC Operation with PLC control
- Image grab & Data log
- More than 100 Program recipes

Item	Specifications
Type	PC control Semi Auto
Mask size	Up to 9” x 9”
Substrate size	Piece to 8” Ø
UV lamp & power	1 kW & power supply
Uniform beam size	9.25” x 9.25”
Beam uniformity	< ± 5 %
Beam wavelength	350 ~ 450 nm
365 nm intensity	15 ~ 25 mW/cm^2
Alignment accuracy	1 µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact
Process mode	Soft, hard, vacuum contact & proximity
Substrate chuck moving	X, Y (Manual), Z, θ (motorized)
Frame	Anti vibration table
Options	CCD BSA, UV Intensity meter, etc.





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8” Semi Automatic Mask Aligners

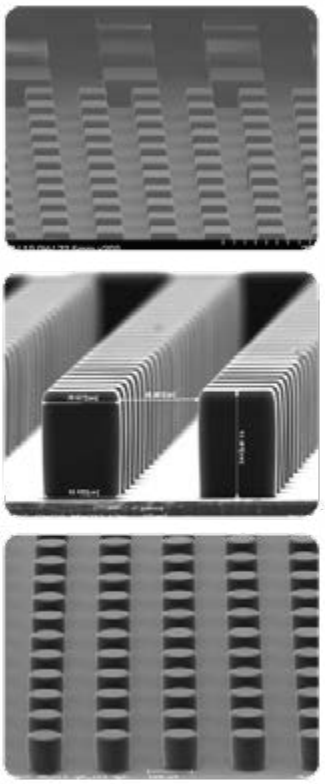
Semi automatic mask aligner MDA-80SA
- Easy operation
- PC Operation with PLC control
- Image grab & Data log
- More than 100 Program recipes
- Motorized joystick control

Item	Specifications
Type	Joystick control Semi Auto
Mask size	Up to 9” x 9”
Substrate size	Piece to 8” Ø
UV lamp & power	2 kW & power supply
Uniform beam size	10.25” x 10.25”
Beam uniformity	< ± 3 ~ 5 %
Beam wavelength	350 ~ 450 nm
365 nm intensity	15 ~ 25 mW/cm^2
Alignment accuracy	1 µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact
Process mode	Soft, Hard, Vacuum contact & Proximity
Substrate chuck moving	X, Y, Z & θ (motorized)
Frame	Anti-Vibration system
Options	CCD BSA, UV Intensity meter, etc.

12" Semi Automatic Mask Aligners

The MDA-12SA is a brand new model and represents the next generation of full-field lithography systems. This brand new Semi Automatic Aligner platform offers a higher Overlay Accuracy and more reliable operation. It is great for Ceramic, other Probe Cards and WLP applications. This machine offers higher productivity and is easy to control.

Item	Specifications
Substrate Size	Up to 12"
UV Lamp Power	2 kW
Resolution	Down to 3 µm (※ FT=1µm @ 12" Si wafer)
Alignment Accuracy	± 3 µm
Lamp Uniformity	≤ ± 5 %
Uniform Beam Size	14.25” x 14.25”
365 nm Beam Intensity	15 ~ 2 mW/cm² (broad band)
Exposure Time	0.1 ~ 999.9 sec
Motorized	Microscope X, Y-axis, Zoom and Focus Stage X, Y, θ and Z-axis
Process mode	Vacuum, Hard, Soft and Proximity
Dimension	1.700 x 1.500 x 2.100 mm



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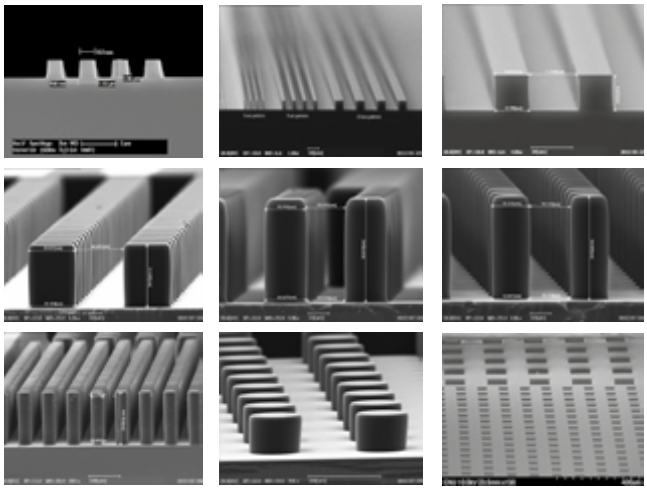
8” Full Automatic Mask Aligner

Full automatic mask aligner MDA-80FA
- Easy operation
- PC Operation with PLC control
- Image grab & Data log
- More than 100 Program recipes
- Microscope position control system
- Auto Align mark searching function

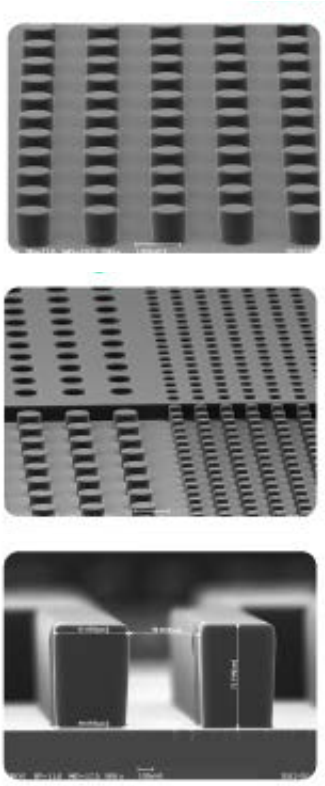
Item	Specifications
Type	Full automatic
Mask size	up to 9” x 9”
Substrate size	Piece to 8” Ø
UV lamp & power	2 kW & power supply
Uniform beam size	10.25” x 10.25”
Beam uniformity	< ± 5 %
Beam wavelength	350 ~ 450 nm
365 nm intensity	25 mW/cm^2
Alignment accuracy	1 µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact
Process mode	Soft, Hard, Vacuum contact & Proximity
Substrate chuck moving	X, Y, Z, & θ (motorized)
Frame	Anti-Vibration system
Options	UV Intensity meter, etc.



MDA-12FA

The MDA-12FA is a brand new model and represents next generation of Full-field lithography systems. This brand new Full Auto Mask Aligner platform offers a higher Overlay Accuracy and a more reliable operation. This machine offers higher productivity and easy control.

Item	Specifications
Substrate size	8 ", 1" (Option 300 x 300 mm)
UV Lamp Power	2 kW [5 kW]
Resolution	2 µm with 1 µm thin @ Si wafer
Alignment Accuracy	<0.5 µm
Lamp Uniformity	≤5 %
Uniform Beam Size	14.25” x 14.25”
365 nm Beam Intensity	2 kW (20~30 mW/cm²) 5 kW (40~90 mW/cm²)
Motorized	Microscope X, Y -axis, Zoom and Focus Stage X, Y, θ and Z-axis
Process mode	Vacuum, Hard, Soft and Proximity
Option	BSA / Auto Mask Changer



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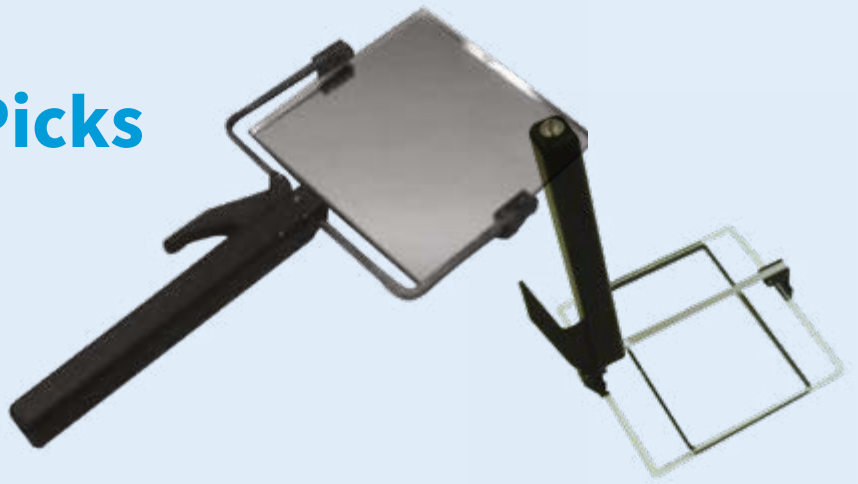
Mask, Reticle & Mechanical Picks



Mask & reticle picks

Our line of photolithography mask & reticle picks and handling equipment are the result of years of working with semiconductor companies and mask shops to provide a non-contaminating secure means of handling photo masks. With the stringent cleanliness requirements for sub-micron applications today, SPS-Europe's mask handling tools have become indispensable.

Features

- Tangential edge-grip only: no front or back face contact.
- Compatible with most pelliclized square reticles and round masks with flats.
- Minimal moving parts for simple cleaning and low particle generation.
- Lightweight, economical and easy-to-use with trigger-type gripping mechanism.
- V-type grippers allow masks with beveled edges to be loaded from flat surfaces.
- Various gripper widths and V-groove depths allow customizing for each application.

MCP mechanical edge grip picks

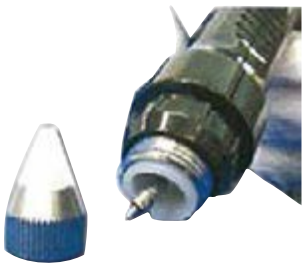
These custom-fit, normally closed, outside diameter wafer edge handling tools provide clean constant-force handling from the edge exclusion zone of a substrate. Using high performance plastics and Kalrez® touch pads, these tools are highly customized for specific applications and are available for substrates of all sizes, materials and thicknesses.

Ionizing Air Pencil

The pencil-type air ionizer can help remove static electricity on a material or object. This device is an ideal tool to clean parts and assemblies, not only in the Semiconductor market but also in the Medical and Electronic Industries.

Quickly and easily, remove dust that adheres to surfaces such as silicon wafers and masks. An Ø1.5 mm air outlet and concentrated fast airflow are most suitable to effectively remove microscopic dust particles. The internal safety circuit cuts off HV power when it detects an abnormality in the HV circuit. A low voltage cable (modular) for easy and simplified operation connects pen and controller.

Item	Specifications
Input voltage	DC24V (using an AC adaptor: AC90V- AC264V 50/60 Hz)
Input current	0.5A max
Gas pressure	0.3 MPa max (pressure speed control is adjustable)
Purge gas	Air or nitrogen
Emitter material	Polysilicon
Ambient temperature	10 °C - 40 °C
Ambient humidity	35 % RH - 65 % (non - condensing)
Weight of pen	130 g
Weight of controller	750 g



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UV Intensity Meter

The MIDAS UV Intensity meter is a great tool for measuring the intensity power for Mask Aligners. This UV Intensity meter represents next generation of full-field UV Intensity meter systems. The sensor and probes are fully digital, so no calibration is needed.

Item	Specifications
Wavelength	365nm (option: 405 nm / 248 nm)
Uniformity	Automatic calculation
Measuring point	5 ~ 9 point
Battery	Recharging type
Dimension (mm)	80×150×45 (W×D×H)

Inspection Lamp

These inspection lamps were developed for inspecting wafers with possible use of a microscope. Using the mounting flange, it is possible to fix the inspection lamp onto a microscope or onto any process machine.

Benefits

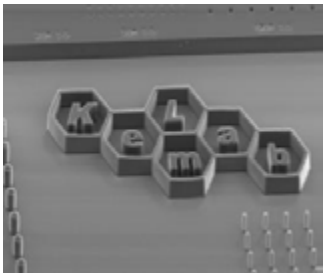
- No UV or infraded light (even with white)
- Long service life 10 years on the LED
- Colour selection for each inspection process

We have different colour lamps available, contact us for all options.

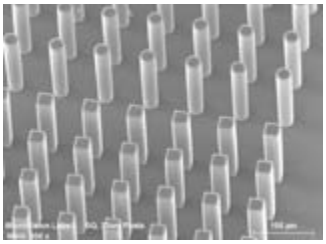
Photoresist products

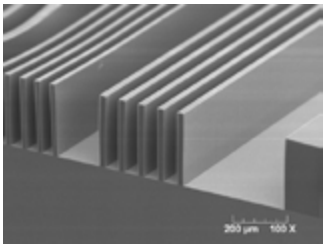
KemLab™ is a photoresist manufacturer and photolithography research and innovation company focused on quality and cost-competitive high-tech photosensitive imaging materials used in the electronics industry. Offering Positive and Negative photoresists for advanced packaging, MEMS & Microfluidics, integrated circuits, metal lift-off, compound semiconductors, LED, image reversal, diffraction gratings and sensor markets.

HARE SQ
Negative Tone Epoxy

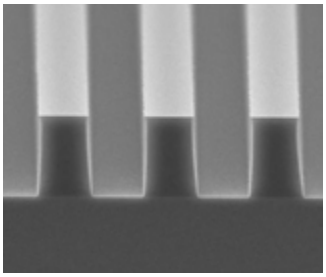


NEGATIVE
- 2 - 200 µm FT
- Applications: Microfluidics, MEMS

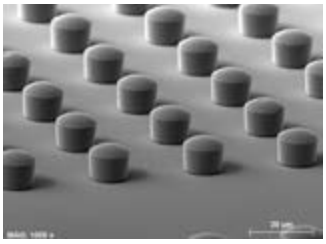


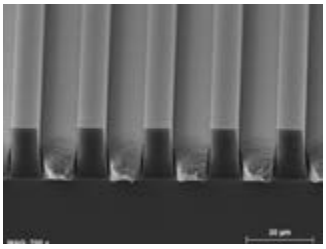


K-PRO
Advanced Packaging

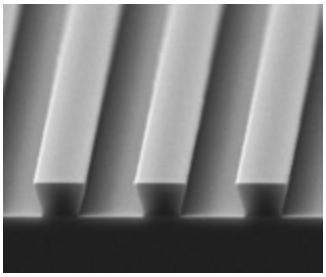


POSITIVE
- 5 - 50 µm FT
- Applications: Advanced packaging, TSV, Bumping, Plating

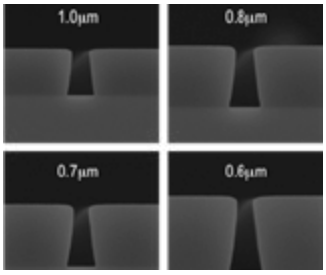


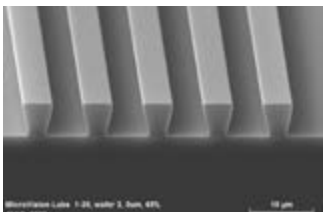


APOL-LO 3200
Negative Lift-Off

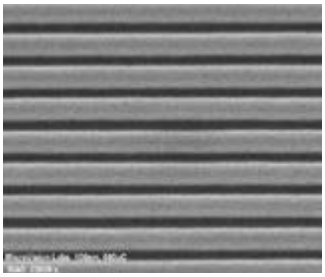


NEGATIVE
- 2 - 210 µm FT
- Applications: Compound Semiconductor, LED

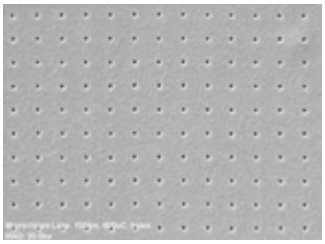




HARP eB & HARP-C
PMMA e-Beam / Copolymer



POSITIVE
- Up to 4.0 µm FT
- Applications: Direct Write, T-gates, Wafer Thinning



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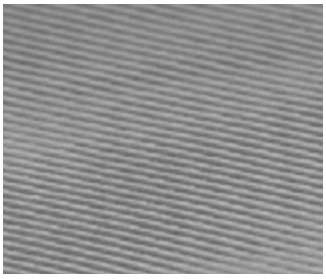
Benefits

- Short lead times
- Competitive pricing
- Product support
- Resist customization

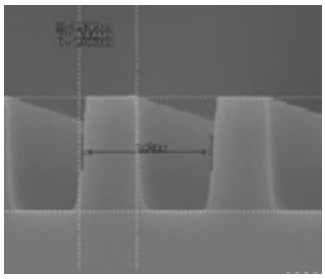
We can offer a variety of photoresists. Visit our website to find the complete list of resists by film thickness, competitive products, tone, developer, or exposure.

KL 5302
Hi-Res Thin



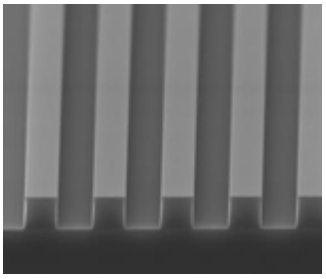
POSITIVE
- 2 - 200 µm FT
- Applications: Interference, Lithography, Diffraction Grating

KL 5300
General Purpose Thin



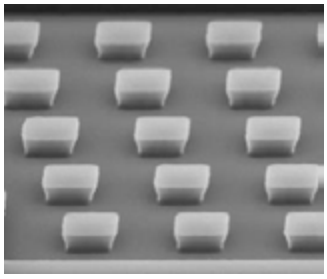
POSITIVE
- 0 - 2.5 µm FT
- Applications: IC Fabrication

KL 6000
General Purpose Thick



POSITIVE
- 2.5 - 12 µm FT
- Applications: MEMS, Bumping, Etching, Plating

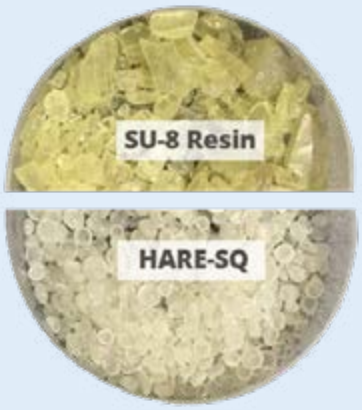
KL IR
Image Reversal Lift-Off



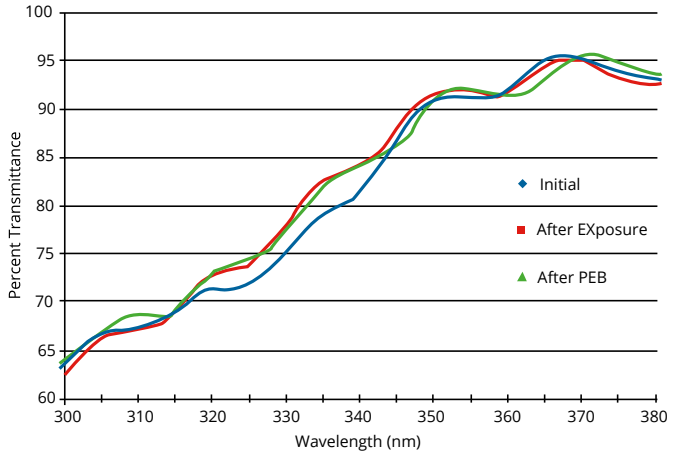
POSITIVE/NEGATIVE
- 1 - 2.5 µm FT
- Thermally stable high-res lift-off

Negative tone photoresist HARE-SQ

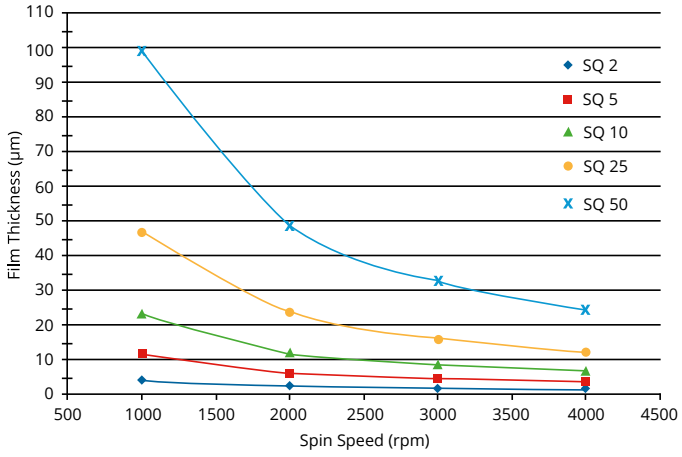
HARE-SQ (High Aspect Ratio Epoxy / Superior Quality) is an epoxy based negative photoresist designed for polymeric MEMS, microfluidics, micromachining and other microelectronic applications. The HARE-SQ system is designed for use in thick film applications of 2 to 100 µm, and is ideal for use in permanent applications in which the photoresist remains within the finished device.



HARE-SQ: Percent Transmittance vs. Wavelength



Film Thickness vs. Spin Speed



- Clearer layer (cleaner then SU-8 Resin)
- Lower opacity (Higher transparency – less dosing power/power intensity required)
- Fewer particles
- Fewer micro-bubbles
- More consistent product

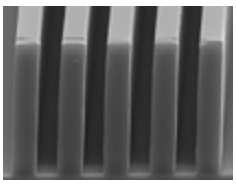
Advantages

- The HARE-SQ photoresist uses an epoxy resin with superior cleanliness and excellent reproducibility
- Consistent surface energy of cross-linked resist (an important property for microfluidic applications).
- Fully compatible with SU-8 processes.

Substrate

HARE SQ adheres to variety of substrates; including silicon, gold, aluminum, chromium and copper
Proper substrate cleaning & dehydration improve adhesion.

Logo & posts in 50 µm film



5 µm dense line/ space in 25 µm film

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Process guide

Product	SQ-2	SQ-5	SQ-10	SQ-25	SQ-50	SQ-50
Film thickness	**2 µm**	**5 µm**	**10 µm**	**25 µm**	**50 µm**	**100 µm**
Softbake (2 step)	65 °C for 1 min 95 °C for 1 min	65 °C for 1 min 95 °C for 3 min	65 °C for 2 min 95 °C for 5 min	65 °C for 3 min 95 °C for 7 min	65 °C for 5 min 95 °C for 15 min	65 °C for 10 min 95 °C for 30 min
Expose (broadband) on Si	200 mJ/cm²	180 mJ/cm²	180 mJ/cm²	180 mJ/cm²	180 mJ/cm²	180 mJ/cm²
Post exposure bake (2 step)	65 °C for 1 min 95 °C for 1 min	65 °C for 1 min 95 °C for 1 min	65 °C for 1 min 95 °C for 2 min	65 °C for 1 min 95 °C for 3 min	65 °C for 1 min 95 °C for 5 min	65 °C for 2 min 95 °C for 10 min
Develop (immersion)	1 minute	1 minute	2.5 minutes	3.5 minutes	6 minutes	15 minutes

Process information

Coat

Spin Coat: Film Thickness is targeted using the spin speed curve (shown at the bottom table on the previous page). The coat program uses 5-10 second spread cycles. Spin time at final speed is 30 seconds. Coating techniques such as spray coat, slot coating, and other additive techniques are possible; please contact SPS for more information.

Soft Bake

The recommended soft bake for the HARE-SQ utilizes a two-step bake on a contact hot plate in order to minimize film stress and adhesion issues.
See Process Guide Table for details.

Exposure & optical parameters

HARE-SQ is designed for near UV (300 - 400 nm) exposure wavelengths. Exposure dose will vary depending on the exposure tool set, film thickness, and process conditions. Nominal exposure doses are shown in the Process Guide for broadband exposure with a 360 nm cutoff filter at the thicknesses and processes shown.

Post-exposure bake (PEB)

Recommended PEB time is adjusted according to film thickness in order to ensure sufficient crosslinking of the resist film. A two-step PEB is recommended to reduce film stress which can lead to cracking and/or adhesion loss.
See Process Guide Table for details.

Develop

HARE-SQ is designed for use with industry standard developes. It can be developed using immersion, puddle or spray puddle. Thicker films benefit from refreshing developer during the develop step; such as with a double puddle.

Rinse developer off substrate with isopropyl alcohol (IPA) & dry.
See Process Guide Table for details.

Hard bake

HARE-SQ can be hard baked for permanent applications that would benefit from further crosslinking.

Bake at >120°C for at least 5 minutes (hot plate). A short hard bake can fuse cracks caused by film stress.

For permanent structures, temperatures above 150 °C are recommended. Oven bake will increase crosslinking with minimal increase in stress.

Handling & disposal considerations

HARE-SQ is compatible with typical waste streams used with photoresist processing. It is the user's responsibility to dispose in accordance with all regulations.

Spinner comparison

Specifications SPIN spin coaters
- Programmable CW & CCW and puddling rotation
- Automatic safety lid lock with sensor interlock
- Speed 0 rpm - 12.000 rpm, accuracy +/- 0.1 rpm
- Acceleration / deceleration 1 - 30.000 rpm/sec, selectable per step

Specifications POLOS advanced series
- Automatic safety lid lock with sensor interlock
- Automatic sequential or parallel chemical dispense
- Up to 6 spray nozzles, each independently programmable

	SPIN150i	SPIN200i	POLOS200 Advanced	POLOS300 Advanced	POLOS450 Advanced
Max. substrate diameter	160 mm round or 4” x 4” square	260 mm round or 6” x 6” square	260 mm round or 6” x 6” square	360 mm round or 8” x 8” square	460 mm round or 10” x 10” square
Max. process chamber diameter	202 mm	302 mm	302 mm	402 mm	502 mm
Dimension (desktop version)	274 (w) x 250 (h) x 451 (d) mm	380 (w) x 307 (h) x 559 (d) mm	380 (w) x 307 (h) x 559 (d) mm	430 (w) x 310 (h) x 650 (d) mm	795 (w) x 638 (h) x 922 (d) mm
Shipping weight	14 kg	20 kg	20 kg	32 kg	75 kg
Shipping dimensions	600 x 380 x 360 mm	680 x 580 x 480 mm	680 x 580 x 480 mm	780 x 620 x 580 mm	800 x 790 x 1180 mm
Free programmable outputs	3 dry relays, nominal switching capacity 0.5A / 125 VAC - 0.3A / 60DC 3 Programmable Dry Contacts: e.g. for automated control of Dispense unit, Nitrogen diffuser, etc.		3 dry relays, nominal switching capacity 0.5A / 125 VAC - 0.3A / 60DC Up to 16 digital input, 16 digital output, 4 analog input, 4 analog output (with optional IO modules)		

Requirements

Voltage	100 - 120 VAC / 200 - 240 VAC 50 / 60 Hz (auto select)	
Power consumption	Max. 500 W	Max. 1800 W
Max. current	5 A / 2.5 A	10 A / 8 A
Vacuum	- 65 kPa (-19 inHg), ≥ 80 LPM Tube OD Ø8 mm	- 80 kPa (-24 inHg), ≥ 80 LPM Tube OD Ø8 mm
Motor purge gas	20 - 50 kPa, 2-5 L/min, tube OD Ø 6 mm 500 L/hr	
Drain connection	1” M-NPT	

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SPIN150i spin coater

The single wafer spin coater SPIN150i is available in NPP or PTFE. These high quality spin coaters are specifically designed for R&D and low volume production in the MEMS, Semiconductor, PV, Microfluidic fields, etc. Suitable for all typical spin processes: cleaning, rinse/dry, coating, developing and etching.

Each Fab, each R&D or even each student in university uses different spin processes. POLOS spin coaters offer unlimited processes: easy, step-by-step recipe programming via a large color touchscreen controller, USB up- or download from your own PC, unlimited programs / steps and graphical representation. And a repeatable spin coating process, time and time again. This makes the POLOS SPIN150i the best laboratory spin coater you can buy! The SPIN150i for up to 150 mm substrates includes a vacuum chuck A-V36 and fragment adapter D-V10. A variety of nozzles, megasonic cleaning and dispense lines can be added as options.
The low-cost SPIN150i spin coater is suitable for processing fragments as small as 5 mm up to Ø150 mm (or 6") or 4" x 4" substrates.

System data	SPIN150i
Housing material	Natural polypropylene (NPP)
Process chamber material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Interface	Detachable, full-size touchscreen, glove friendly, IP52, chemical resistant
External connection	1 USB port on the side of your display
Max. substrate diameter	160 mm round or 4" x 4" square
Max. process chamber diameter	202 mm
Dimension (desktop version)	274 (w) x 250 (h) x 451 (d) mm

Options SPIN150i & SPIN200i

Syringe holder starter kit consisting of 30cc dispense barrels, needles and plungers.

Center dispense system with higher reliability of results.

Centering tool is easy to use and adjustable for different substrate sizes.

Dispense unit can be mounted in syringe holder and be connected to one of the 3 programmable dry contacts.

SPIN200i spin coater

The single wafer spin coater SPIN200i is an advanced system that offers precise, repeatable process control. An aerodynamically efficient chamber enhances uniformity, while the natural polypropylene or PTFE construction ensures a metal-free, contamination-free process area that is easy to clean.

The SPIN200i comes with a chuck that will hold from 4” to 8” wafers. This spin coater offers exceptional value and capability: precision speed range of up to 12.000 rpm, programmable in 1 rpm, for CW, CCW rotation (ideal for “puddle” develop), and per-step acceleration of max. 30.000. It is also programmable in 1 rpm, to cover any process requirement. It is programmed through an easy-entry color touchscreen. The self-explanatory icons make it easy to operate even for new users.

A quality choice for the long-term, all our spinners are designed and manufactured in Germany.

System data	SPIN200i
Housing material	Natural polypropylene (NPP)
Process chamber material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Interface	Detachable, full-size touchscreen, glove friendly, IP52, chemical resistant
External connection	1 USB port on the side of your display
Max. substrate diameter	260 mm round or 6” x 6” square
Max. process chamber diameter	302 mm
Dimension (desktop version)	380 (w) x 307 (h) x 599 (d) mm

Options SPIN150i & SPIN200i

Liners are available in PET. 0.5mm thick, transparent, antistatic (108 - 1010 Ω) to prevent possible build-up of static charge in the chamber.

Central Dispensing Syringe Holder for single or triple syringes, with integrated N2 diffuser.

Corrugated Drainhose and connector in NPP, including connection to connect to the drainport.

Foot Switch for hand free usage; controlling start/stop function and vacuum.

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POLOS200 Advanced

Our high quality, all NPP and PTFE POLOS single wafer spin coaters are specifically designed for R&D and single wafer production in the MEMS, Semiconductor, PV, Microfluidic fields, etc. Suitable for all typical spin processes: cleaning, rinse/dry, coating, developing and etching.

The POLOS200 Advanced “Top of the line” spin coater supports fragments starting from 5 mm up to 200 mm (or 8”) or 6” x 6” square. This revolutionary spin coater can be used as a full automatic solution for your process. The system will support a large variety of fluids thanks to the full plastic housing available in natural polypropylene as well as PTFE. The control of the motor mode rotation (clockwise/counterclockwise), in combination with the up to 6 automatic dispensers in the POLOS Advanced systems, enables a uniform deposition of multilayer thin films and photoresist development. These features enable a quick process optimization with fully automatic recipes and high reproducibility.

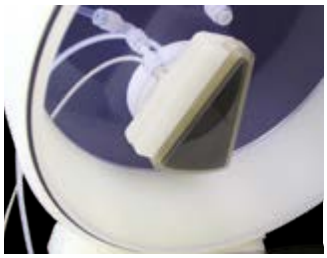
System data	POLOS200 Advanced
Housing material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Process chamber material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Interface	Detachable, full-size touchscreen, glove friendly, IP52, chemical resistant
External connection	1 USB port on the side of the display
Max. substrate diameter	260 mm round or 6” x 6” square
Max. process chamber diameter	302 mm
Dimension (desktop version)	380 (w) x 307 (h) x 599 (d) mm

Options

The vacuum pump is quiet and reliable.

Auto Dispense Lines
Full PTFE dispense vessel automated injector line.

Jet Spray injector for accurate dispensing of chemicals, with adjustable dispensing position.



The sapphire MegPie is a single-wafer megasonic transducer used for cleaning and sonochemical processing.

POLOS300 Advanced

The POLOS300 Advanced single substrate spin processor is perfectly suitable for a wide range of applications, including drying, rinsing, cleaning, and coating. This table-top spin processor is seamless build in a full-plastic, housing in natural polypropylene (NPP) or optional PTFE, and is suitable for processing fragments as small as 5 mm up to substrates sizes up to Ø 300 mm or 8” x 8”.

POLOS300 Advanced Table Top

The POLOS300 Advanced allows the user to either dispense manually through a syringe, or use the optional manifold with a selectable valve for dispensing one (1) chemical from the dispense vessel (DV), DI water or N2.

Capabilities

- Post-CMP cleaning
- LIGA processes
- TSV processing
- Mask cleaning
- Etch assist
- SU-8 develop
- Plating pre-cleaning
- Lift off
- Pre-plating bubble removal
- Resist strip
- Post-laser cleaning

System data	POLOS300 Advanced
Housing material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Process chamber material	Natural polypropylene (NPP or high chemical resistant PTFE (TFM™)
Interface	Detachable, full-size touchscreen, glove friendly, IP52, chemical resistant
External connection	1 USB port on the side of your display
Max. substrate diameter	300 mm round or 8” x 8” square
Max. process chamber diameter	342 mm
Dimension (desktop version)	430 (w) x 310 (h) x 650 (d) mm

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POLOS450 Advanced

The POLOS series spin processors are advanced systems, offering precise, repeatable process control. An aerodynamically efficient chamber enhances uniformity, while natural polypropylene process chamber guarantees a contamination-free, easy to clean process area. All units feature programmable CW & CCW Rotation and puddle function.

POLOS450 Advanced Table Top

Table top Single Substrate Spinner with NPP housing, spincup and manual chemical dispense. With 500 mm inside diameter for substrates up to max. Ø 500 mm round and 350 x 350 mm square substrates.

Features

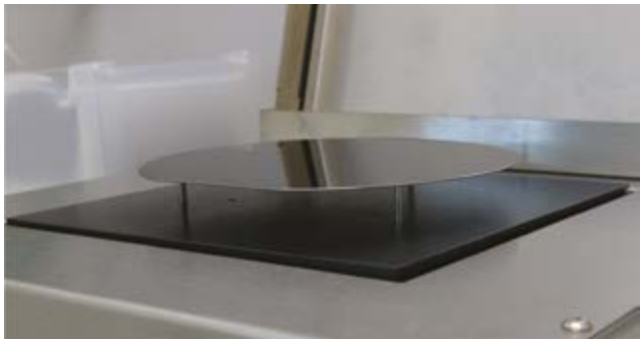
- Automatic Sequential or Parallel Chemical Dispenses
- Up to 6 spray nozzles, ach programmable independently

Specifications	POLOS450 Advanced Table Top
Spin speed RPM	0 - 1.500 rpm** ± 1 rpm steps
Spin speed accuracy	± 0.1 rpm**
Spin rotational direction	Clockwise, Counter clockwise and Puddle
Max. acceleration	≤1.500 rpm/s depends on the load**
Free programmable outputs	3 dry relays, nominal switching capacity 0.5A /125 VAC - 0.3A / 60DC
Max. substrate diameter	460 mm round and 350x350 mm square substrates
Max. process chamber diameter	502 mm
Dimension (desktop version)	795 (w) x 638 (h) x 922 (d) mm
Motor purge gas	20 - 50 kPa. Tube OD Ø 6mm 500 L/hr
Drain connection	1.5” M-NPT

**Measured without substrate, limitations may apply depending on chuck used and substrate specification.

POLOS Precision Bake Plate

Our table top hotplate enables upgradeable options including lifting pins, vacuum bake, proximity pins and hinged lid, making it a versatile and affordable tool for R&D and pilot lines. A precision digital temperature controller enables adjustable temperature steps of 1 °C up to 230 °C. It is suitable for soft bake as well as hard bake processes, and curing of photoresist, epoxy or any other work requiring precise temperature control.



Operational environments. The system is designed for an ambient temperature of 10 °C - 40 °C.

Features

- Diagnostic serial interface (RS232)
- Precision temperature controlling system
- Countdown timer (1 - 999 sec.) with acoustic alert
- Low temperature gradient heating unit (safe housing temp.)

Options

- Hinged lid
- Lifting pins
- Proximity pins
- Vacuum bake

Measurement & Weight	HL200S
Weight	12 kg
Dimensions device	450 x 320 x 135 mm
Dimensions with Hinged Lid	450 x 320 x 200 mm

Operating requirements	HL200S
Voltage	110 or 240 VAC/ 50/60 Hz
Max. current	2.5 / 5A
Power consumption (max.)	550 Watt

HL200S specifications

- Temperature ranges from 50 - 230 °C (adjustable in steps of 1 °C)
- Programmable storage of 10 programs (temperature/time)
- Temperature uniformity ± 0.5 °C
- Heater surface area 220 x 220 mm
- Suitable for 1 x 8” wafer
- Heater block material: aluminum (anodized) or PTFE coated

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POLOS SPIN Wet Station

An extremely versatile platform for a wide range of processes. Based on the proven high quality POLOS single substrate spin processor, the modular design spin process station provides excellent value for money: full plastic construction, with high-end components, compatible with any chemical environment in a modular set-up, suitable for your specific requirement.

The seamless integration of polypropylene (optional PTFE) spin processor in the base station allows you to work with all kinds of chemicals. In the station housing various modules can be incorporated and centrally controlled for supply of chemicals and gases.

Standard configurations are available for cleaning substrates as well as photo masks, photoresist coating, developing, etching and lift-off processes.

Value for money: Fully automatic, accurate and repeatable processing.

Automatic dispense

- Static chemical dispense through a range of adjustable nozzles in the domed lid. Adjustable back-side spray arm. Heavy-duty motor: programmable for 1 to 12.000 rpm. CW & CCW rotation allowing puddle mode. Megasonic is available as an option.

Freely programmable process

- Sequentially programmable multiple dispense lines.
- Step-less programming of various flows within a process step from 150 up to 2500 ml/min (depending on dispense line thickness). For optional integrated mixing systems, the mixing rates of the various chemicals can be programmed per step.

Source: Fraunhofer ENAS-Dr. Knut Gottfried, Precise Bulk Silicon Wet Etching 2013

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FR-pOrtable USB-powered film characterization tool at the Point-of-Need

FR-pOrtable is a unique miniaturized solution for accurate & precise non-destructive characterization of transparent and semi-transparent single films or stack of films.

With FR-pOrtable the user can perform reflectance and transmittance measurements in the 380 - 1020 nm spectral range.

The compact size of FR-pOrtable and the custom designed reflection probe, guarantee highly accurate and repeatable measurements.

FR-pOrtable, can be either mounted on the supplied stage or can be easily transformed to a handheld thickness measurement tool to be placed over the sample under characterization.

FR-pOrtable is the only optical characterization tool for in-field applications.

Applications

- Universities & Research labs
- Semiconductors (Oxides, Nitrides, Si, Resists, etc.)
- MEMS devices (Photoresists, Si membranes, etc.)
- LED
- Data Storage
- Hard/Soft coatings on curved substrates
- Polymer coatings, adhesives, etc.
- Biomedical (parylene, balloon wall thickness, etc.)
- And more… (contact us with your requirements)

Features

- Thickness measurement range: 12 nm to 90 µm
- Refractive Index (n & k) calculation
- Broad Spectral Range: 380 nm – 1020 nm
- USB powered
- Portable
- Reflectance, Transmittance, Absorption and Color parameters

Accessories

- At-the-Field adaptor: For measurements at the Point-of-Need
- Transmittance module: For the measurement of transmittance & absorbance spectra of coatings, coating thickness etc.
- Manual X-Y stage: For the characterization of coatings at multiple positions (manual movement)

Principle of Operation

White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a range of wavelengths, with the incident light normal (perpendicular) to the sample surface.

The measured reflectance spectrum, produced by interference from the interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.

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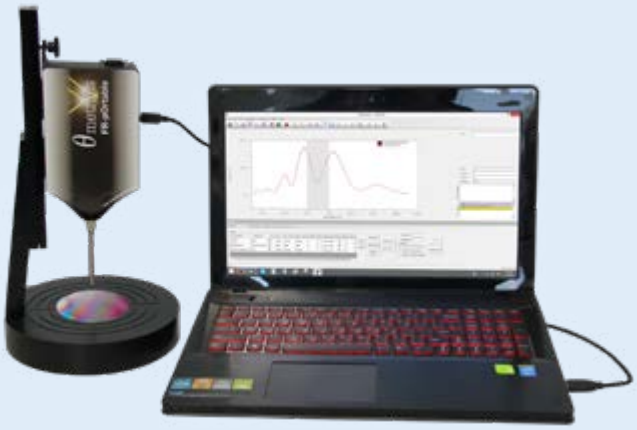

Specifications

Thickness range*	12 nm - 90 µm
Refractive Index calculation	✓
Thickness Accuracy[1]	0.2 % or 1 nm
Thickness Precision[2,3]	0.07 nm or 1 ‰ (0.01 nm[3])
Thickness stability[4]	0.06 nm
Sample size	1 mm to 180 mm and up
Spectral Range	380 nm - 1020 nm
Working distance	3 mm - 20 mm
Spot size	360 um (diameter)
Light Source Lifetime	20000 h
Wavelength resolution	0.8 nm
Number of Layers Measured	Max. 5 layers
Measurement time	10 ms
A/D converter	16 bit
Power	USB - supplied
Dimensions	300 mm x 110 mm x 40 mm[5]

*Specifications are subject to change without any notice, [1]Measurements compared with a calibrated spectroscopic ellipsometer and XRD, [2]Average of standard deviation of mean value over 15 days. Sample: 1micron SiO2 on Si wafer, [3]Standard deviation of 100 thickness measurements. Sample: 1micron SiO2 on Si wafer, 42*Standard-Deviation of daily average over 15 days. Sample: 1micron SiO2 on Si wafer, [5]Without the stage

FR-pRo film characterization tool

FR-pRo is a modular and expandable platform for the characterization of coatings in the 1 nm - 1 mm thickness range. FR-pRo tools are tailored to the customer needs and are used in a wide range of diverse applications such as: Absorbance / Transmittance / Reflectance measurements, Film Characterization under temperature and ambient controlled environment or even in liquid environment and many more.

FR-pRo is assembled by user selected modules. The Core Unit accommodate the light source, the spectrometer (for any spectral regime in the 200 nm - 2500 nm range) and the control & communication electronics. Then, there is a wide range of accessories, such as:

- Film/Cuvette Holder for Absorbance/Transmittance and chemical concentration measurements
- Film Thickness kit for characterization of coatings
- Thermal or Liquid kits for measurements under controlled Temperature or in Liquid environment,
- Integration Spheres for diffuse & total reflectance

By the combination of different modules, the final set-up meets any end-user needs.

Applications

- Universities & Research labs
- Semiconductors
- Polymer & Resist characterization
- Chemical measurements
- Dielectric characterizations
- Biomedical
- Hardcoat, Anodization, Metal parts process
- Optical Coating
- Non-metal Films
- And more…

Features

- Single-click analysis (no need for initial guess)
- Dynamic measurements
- Reflectance, Transmittance, Absorption and Color parameters
- Save videos for presentations
- 350+ non-identical materials
- 3-years free of-charge Software update
- Running on Windows 7/8/10

Type*	Spectral Range	Thickness range**
FR-pRo UV/VIS	200 nm - 850 nm	1 nm - 80 µm
FR-pRo VIS/NIR	380 nm - 1000 nm	12 nm - 100 µm
FR-pRo RED/NIR	600 nm - 1040 nm	200 nm - 250 µm
FR-pRo UV/NIR-HR	190 nm - 1100 nm	1 nm - 120 µm
FR-pRo UV/NIR-EXT	190 nm - 1000 nm	3 nm - 80 µm
FR-pRo-D UV/NIR	190 nm - 1700 nm	1 nm - 250 µm

* Specifications are subject to change without any notice;
** Thickness measurements range is representative of the spectra range and refers to a single film layer with refractive index ~1.5 over a high reflective substrate

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Accessories	
Computer	Touch Panel PC with 19" screen
Focusing module	Optical module attached on the reflection probe for <100 µm diameter spot size
Film/Cuvette kit	Transmission measurements of films or liquids in standard cuvettes
External base	To accommodate samples up to 300 mm in diameter (reflectance & transmission)
Scanner (motorized)	Polar (R-Θ) or Cartesian (X-Y) automated stage with wafer chuck. The polar option support reflectance and the Cartesian support reflectance & transmittance
Integrating sphere	For the characterization of specular and diffuse reflectance of coatings and surfaces
Manual X-Y stage	Manual X-Y stage for positioning measurements over an area of 100 mm x 100 mm
Thermal Module	Hot plate embedded in the FR-tool operating in the room temperature - 200 °C range. Programmable temperature controller (0.1 °C accuracy) operated through FR-Monitor
Liquid Module	Teflon® cell for measurements in liquids with optical window (quartz). Sample holder for insertion of the sample into the liquid capable to handle up to 30 mm x 30 mm samples
Flow cells	Measurement of minute values of absorbance, fluorescence in liquids

Principle of Operation

White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a range of wavelengths, with the incident light normal (perpendicular) to the sample surface.

The measured reflectance spectrum, produced by interference from the interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.

FR-Scanner: Automated, Ultra-fast & Accurate wafer mapping

FR-Scanner is a compact bench-top tool for the automatic characterization of films and coatings on wafers, masks or other substrates. FR-Scanner is the ideal tool for the fast and accurate mapping of film properties: thickness, refractive index, uniformity, color etc. Wafers of any diameter (300 mm max.) / shape can be accommodated on the vacuum chuck.

FR-Scanner scans the wafers by rotating the wafer and by moving it linearly (Polar Coordinates) with unparalleled speed and accuracy in both radius and angle. This way, accurate reflectance data with high repeatability are recorded, making FR-Scanner the ideal tool for at-line and on-line characterization of coatings on wafers or other substrates at processing facilities.

It is offered in a wide range of configurations for the characterization of films as thin as few nanometers and as thick as several hundreds of microns and is accompanied with a dedicated S/W for daily routine use. The FR-Scanner provides excellent performance in terms of accuracy, precision, reproducibility and long-term stability.

Applications

- Semiconductor Manufacturing (photoresists, dielectrics, poly-Si, a-Si, DLC, photonic multilayer structures)
- PV Industry
- University & Research labs
- Liquid Crystal Display
- Optical Coatings
- Polymers
- MEMS and MOEMS
- Substrates: transparent (glass, quartz, etc.) and semi-transparent

Features

- Single-click analysis (no need for initial guess)
- Dynamic measurements
- Measurement of n & k, color is included
- Save videos for presentations
- 600+ non-identical materials
- Multiple installations for off-line analysis
- Free of-charge Software update

Principle of Operation

White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a spectral range, with the incident light normal (perpendicular) to the sample surface. The measured reflectance spectrum, produced by interference from the individual interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.

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Process guide

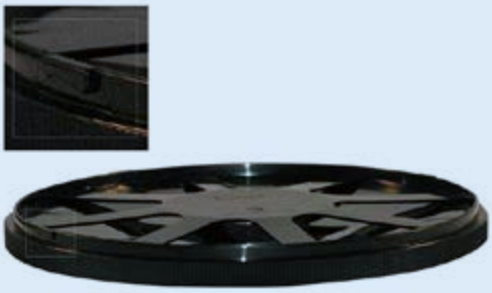
Product	UV/Vis	UV/NIR-EXT	UV/NIR-HR	D UV/NIR	VIS/NIR	NIR D Vis/NIR	NIR	NIR-980	NIR-1310
Spectral Range (nm)	200 - 850	200 - 1020	200 - 1100	200 - 1700	370 - 1020	370 - 1700	900 - 1700	900 - 1050	1280 - 1350
Pixels	3648	3648	3648	3648 & 512	3648	3648 & 512	512	3648	512
Thickness range[1]	3 nm - 80 um	3 nm - 90 um	3 nm - 120 um	1 nm - 250 um	15 nm - 100 um	15 nm - 250 um	50 nm - 250 um	300 nm - 1.2 mm	12 um - 2 mm
Min. Thickness for n & k	50 nm	50 nm	50 nm	50 nm	100 nm	100 nm	500 nm	-	-
Thickness Accuracy[2]	1 nm or 0.2 %	1 nm or 0.2 %	1 nm or 0.2 %	1 nm or 0.2 %	1 nm or 0.2 %	2 nm or 0.2 %	3 nm or 0.4 %	50 nm or 0.2 %	50 nm or 0.2 %
Thickness Precision[3,4]	0.02 nm	0.0 2nm	0.02 nm	0.02 nm	0.02 nm	0.02 nm	0.1 nm	5 nm	5 nm
Thickness stability[5]	0.05 nm	0.05 nm	0.05 nm	0.05 nm	0.05 nm	0.05 nm	0.15 nm	5 nm	5 nm
Light Source	Balanced Deuterium & Halogen				Halogen				SLED
Light Source MTBF	2000 h				5000 h				200000 h
Material Database	> 600 different materials								
Sample Size	Wafers: 2"- 3"- 4"- 6"- 8" - 300 mm[1]								
Resolution in R/Angle	5 µm/0.1°								
Scanning Speed[6]	300 meas/min (8'' wafer size)								
Dimensions (mm)	600W x 750L x 500H & 450W x 320L x 250H								
Power Requirements	110V/230V, 50-60Hz, 300 W								

[1] Specifications are subject to change without any notice, [2] Measurements compared with a calibrated spectroscopic ellipsometer and XRD, [3] Average of standard deviation of mean value over 15 days. Sample: 1micron SiO_2 on Si wafer, [4] Standard deviation of 100 thickness measurements. Sample: 1micron SiO_2 on Si wafer, [5] 2*Standard-Deviation of daily average over 15 days. Sample: 1micron SiO_2 on Si wafer. [6] The chuck can accommodate samples of arbitrary shape. Stage 450mm wafers is also available on request. True X-Y scanning is also possible through custom-made configuration.

Protect your wafers

We offer different solutions to ship your wafers from single wafer shipping shippers, wafer boxes, wafer containers, wafer carrier trays to coin style and clamshell shippers.

SPS never forgets that the most valuable product in the semiconductor and electronics industry is also the most fragile and susceptible to mishandling and contamination. Not all wafers are created equal: with back-grinding, unique material sets, and exotic semiconductor processes, one product does not fit all wafers.



Coin Style Shipper
Conductive PP

From the most advanced eLX wafer canisters to cost-efficient wafer jars, we offer tailor fit products to meet your requirements. Our coin style and clamshell shippers keep the wafers secure and only contact the edges of the wafer during shipping and storage.

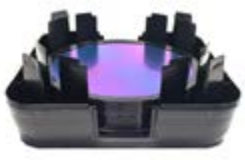
The single wafer shippers are available in different sizes 1”, 1.5”, 2”, 2.5”, 3”, 4”, 5” and 6” and in materials Natural PP or ESD-Safe Conductive PP. They are impact resistant with a screw-on lid for secure packing. Available from stock! Contact us for special requests!

Wafer size	ePAK description	Internal diameter	Order code
1” (25 mm)	eCT1-25-ASSY-1-eM-08-NAT	25.4 mm	eWB0091-ASSY-1
1.5” (38 mm)	eCT1.5-38-ASSY-1-eM-08-NAT	39.6 mm	eWB0325-ASSY-1
2” (50 mm)	eCT2-50-ASSY-1-eM-08-NAT	52 mm	eWB0021-ASSY-1
2.5” (63 mm)	eCT2.5-63-ASSY-1-eM-08-NAT	65.5 mm	eWB0328-ASSY-1
3” (76 mm)	eCT3-76-ASSY-1-eM-08-NAT	78.6 mm	eWB0022-ASSY-1
4” (100 mm)	eCT4-100-ASSY-1-eM-08-NAT	104 mm	eWB0024-ASSY-1
5” (125 mm)	eCT5-125-ASSY-1-eM-08-NAT	127 mm	eWB0060-ASSY-1
6” (150 mm)	eCT6-150-ASSY-1-eM-08-NAT	152 mm	eWB0025-ASSY-1

Process boats and storage boxen for 2, 3, 4, 6 and 8" wafers. The process boats are easy and safe for handling of wafers and are design with open or closed slots.

Wafer shipping boxes for 1, 2, 2,5, 3, 4, 6 and 8" wafers. Designed to hold multiple wafers by the edge.

Plastic wafer jars, with foams and wafer separators and liners for easy loading / unloading in automated or manual applications.



ELX wafer canisters enhanced protection of wafer surfaces. Minimizes lateral movement without applying compression to delicate wafer edges.

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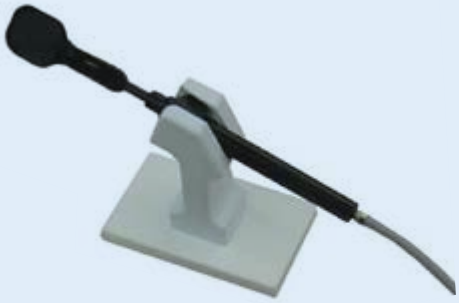
Vacuum & Die Handling

We supply an extraordinary number of different types of vacuum tips for many different sizes, shapes, weights and materials of wafers, substrates, dies and packages and applications/equipment, as well as for a complete range of temperature and chemical environments. We recommend carbon filled PEEK (Polyether Ether Ketone) tips for most applications, especially where ESD protection is a must.



1 T695PKAS
2 T693PKAS3
3 T694PKAS
4 T692PKAS
5 T691PKAS
6 T791PKAS
7 T792PKAS
8 T794PKAS
9 T693PKAS3-001
10 T696PK

Our T69-series anti-static PEEK all-purpose press-fit vacuum tips are suitable for standard wafer handling up to 140 °C - 160 °C. The T791, T792 and T794 are special versions for thin wafer handling with thin vacuum pockets.

Die wafer handling

VVC die handling anti-static tips
Precision machined conductive and high temperature Vespel® rigid vacuum tips for handling of small devices.

BNCSD die handling anti-static cups
Precision molded anti-static nitrile Buna-N soft elastomer vacuum cups for handling of small devices. Anti-static nitrile provides anti-static protection at an economical price.

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