Distribution Products Part 1.1

micro resist technology

Gesellschaft für chemische Materialien spezieller Photoresistsysteme mbH

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Electronic Materials

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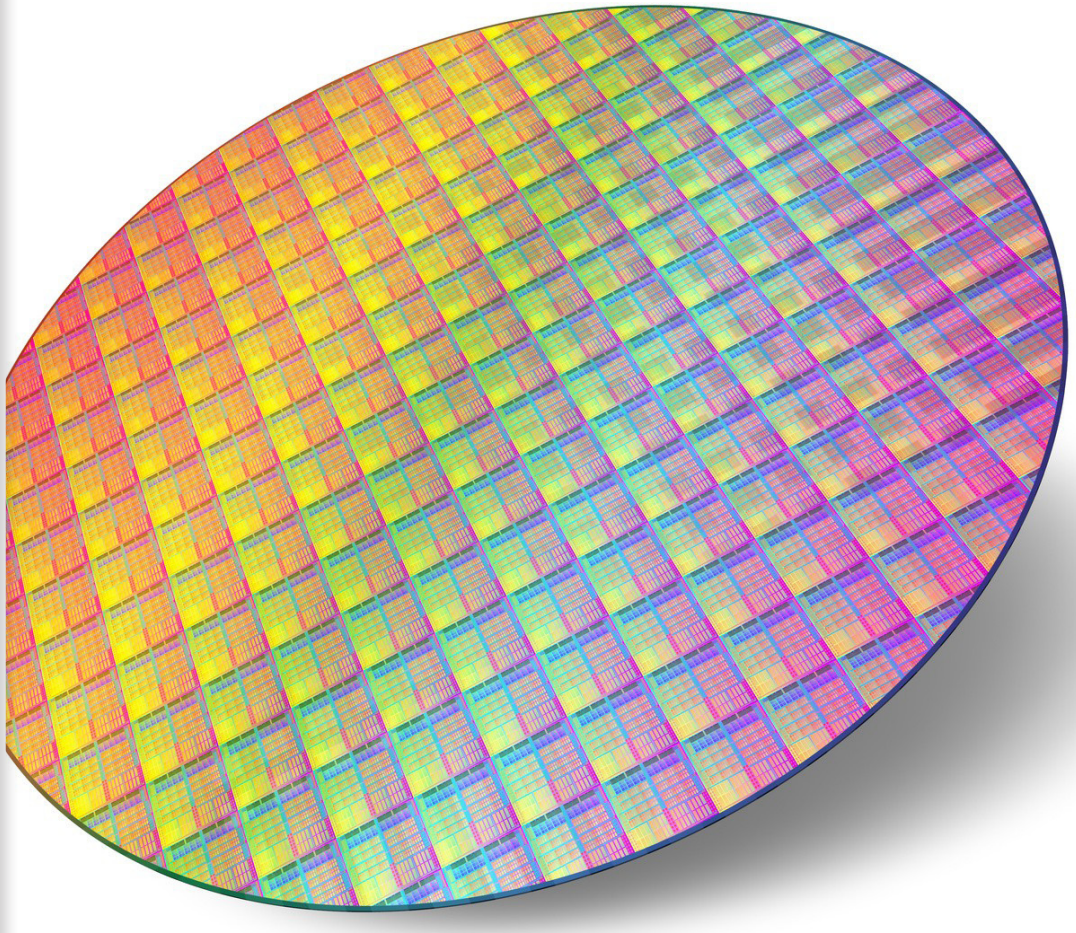
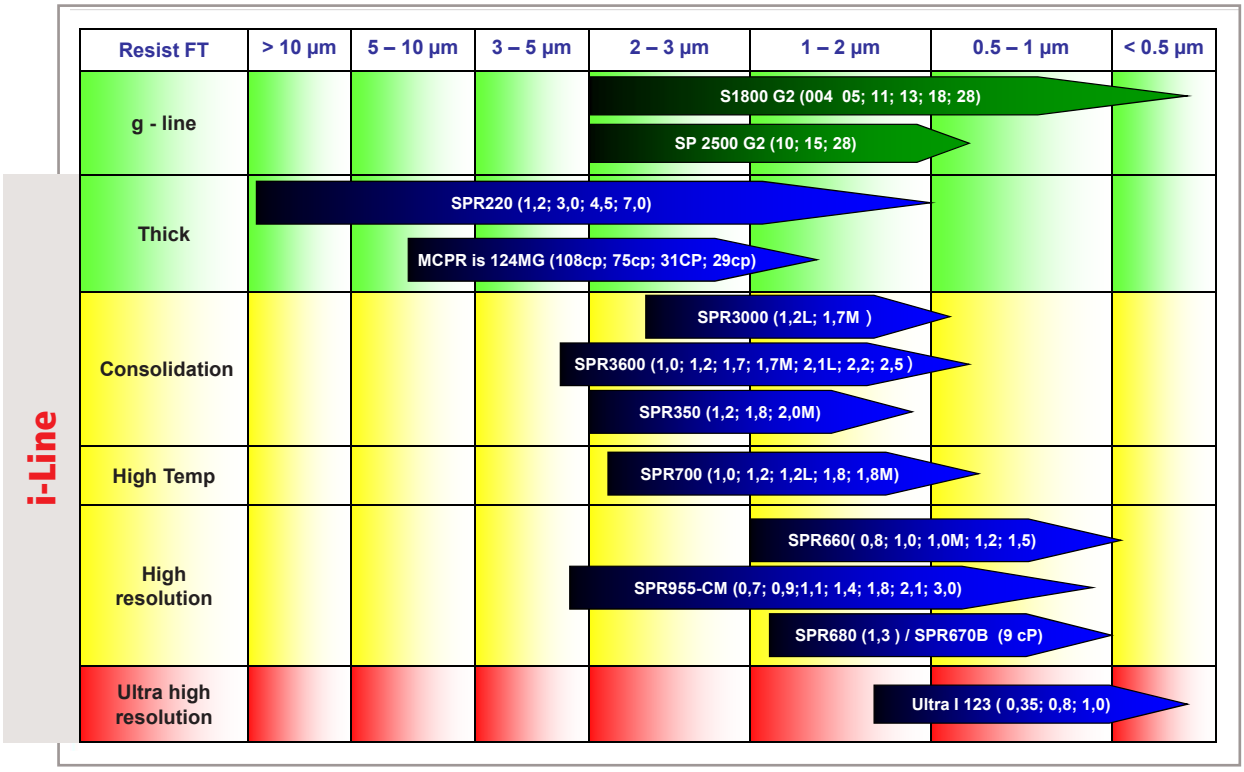
- ⇨ **g-line • i-line • DUV - Resists**
- ⇨ **E-Beam Resist**
- ⇨ **Lift-off Resist**



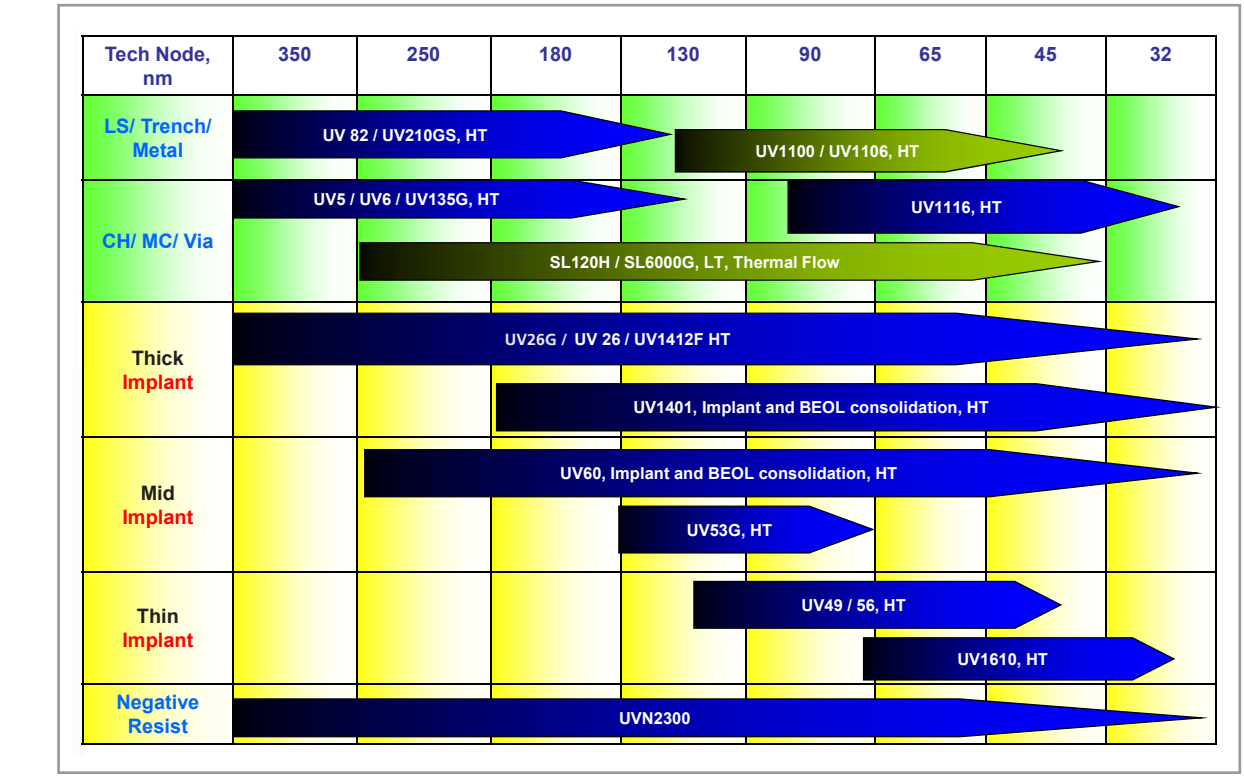
micro resist technology GmbH
Köpenicker Straße 325
12555 Berlin, Germany

fon: +49 30 641670 100
fax: +49 30 641670 200
sales@microresist.de
www.microresist.com

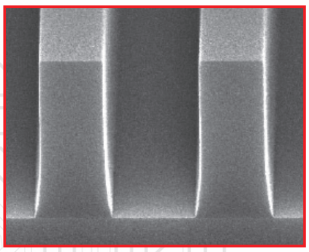
RHEM • g-Line and i-Line Products – Overview vs. Film Thickness



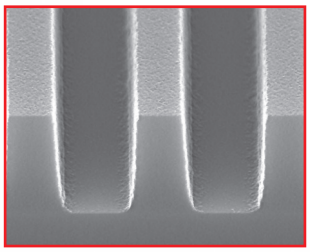
RHEM • DUV Products – Overview vs. Technical Node



Resist	S1828 G2	S1818 G2 (SP16)	S1813 G2 (SP15)	S1811 G2	S1805 G2	S1800 -4 G2
Film thickness @ 4000 rpm	2.8 µm	1.8 µm	1.3 µm	1.1 µm	0.5 µm	67 nm
Viscosity / cSt	88.5	39.4	25	15	5.3	1.5
Dose (Broadband)	300 mJ	200 mJ	160 mJ	140 mJ	100 mJ	-

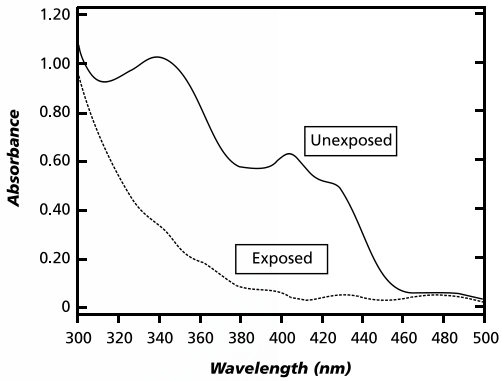


4 µm Ft/ 2 µm L/S 310 mJ



1.3 µm Ft/ 0.8 µm L/S 180 mJ

Absorbance Curve S1800G2



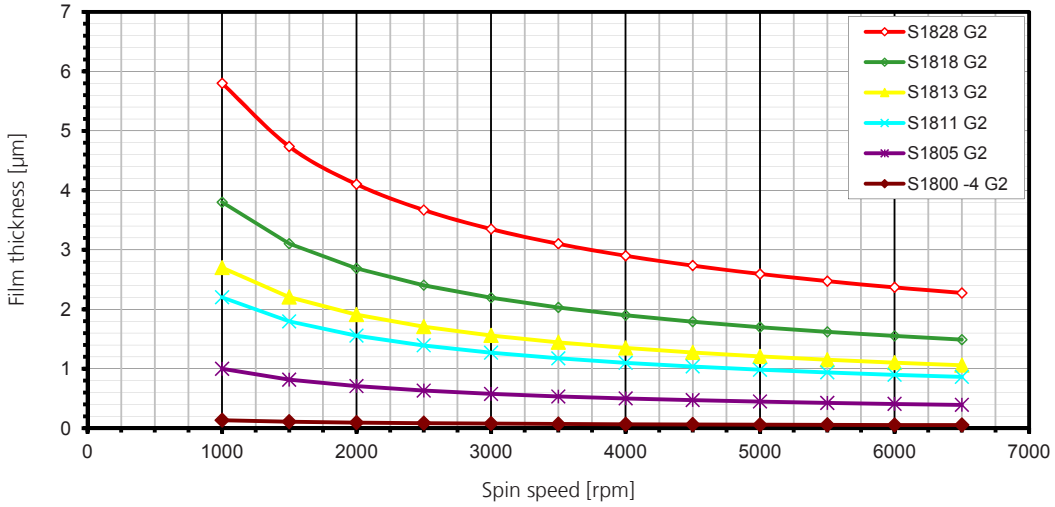
S1800G2

For Microlithography Applications

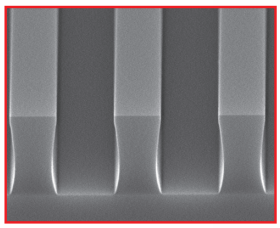
MICROPOSIT S1800 G2 series photoresist are positive photoresist systems engineered to satisfy the microelectronics industry's requirements for IC device fabrication. The system has been engineered using a toxicologically – safer alternative casting solvent to the ethylene glycol derived ether acetates.

Advantages

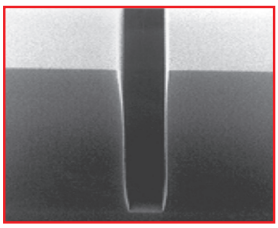
- Optimized for **g-line & i-line exposure**
- Effective for broadband exposure
- Excellent adhesion (Improved with SP)
- PFOS / PFOA – free
- Optimized for use with MF-319 metal-ion-free developer family
- Compatible with metal-ion-bearing developers



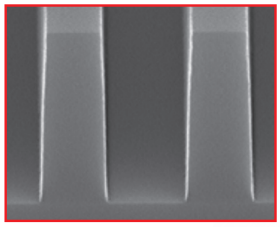
Resist	SPR220-7.0	SPR220-4.5	SPR220-4.0	SPR220-3.0	SPR220-1.2
Film thickness @ 3000 rpm	7.0 µm	4.5 µm	4.0 µm	3.0 µm	1.2 µm
Viscosity / cSt	390	123	84	49	11.5
Dose (i-line)	470 mJ	380 mJ	350 mJ	310 mJ	160 mJ

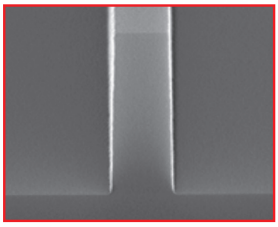


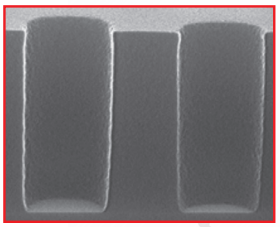
8 µm Ft/ 5 µm L/S 310 mJ



4.3 µm Ft/ 0.8 µm L/S 440 mJ

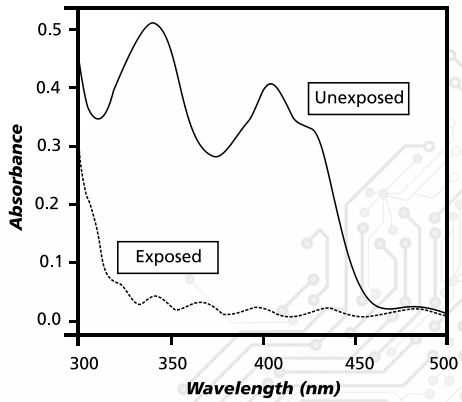






3.0 µm Ft/ 1.0 µm L/S 220 mJ

Absorbance Curve SPR220



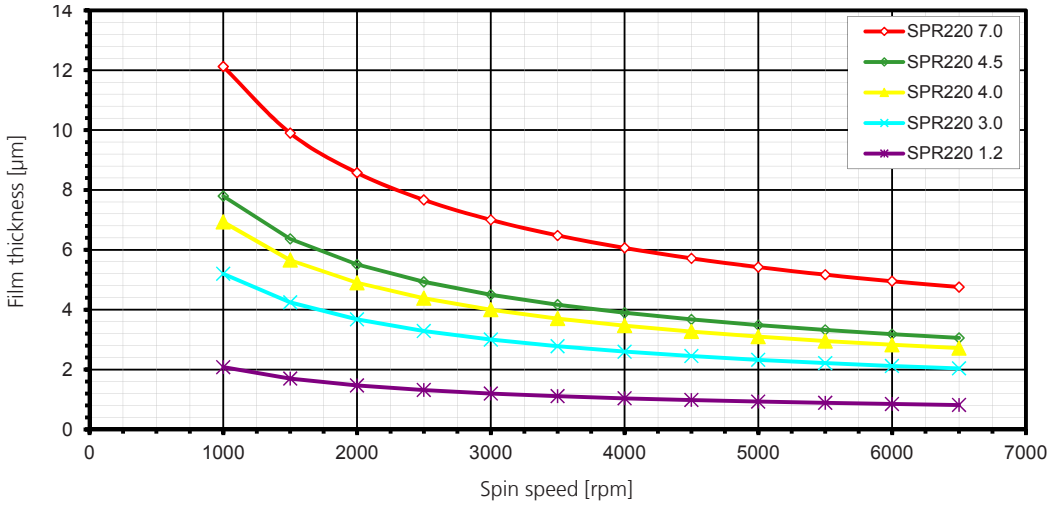
SPR220

For Microlithography Applications

MEGAPOSIT SPR220 i-line photoresist is an optimized general-purpose, multi-wavelength resist designed to cover a wide range of film thicknesses, 1-30 µm, with a single-coat process. MEGAPOSIT SPR220 photoresist also has excellent adhesion and plating characteristics, which make it ideal for such thick film applications as MEMS and bump process.

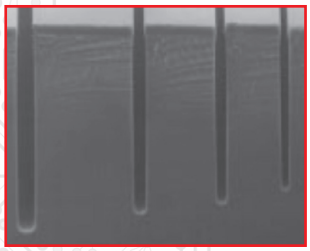
Advantages

- Broadband, g-line and i-line capable
- >10µm film thickness in a single coat with good uniformity
- Excellent wet and dry etch adhesion
- Au; Cu and Ni/Fe plating without cracking
- MIF and MIB developer compatible

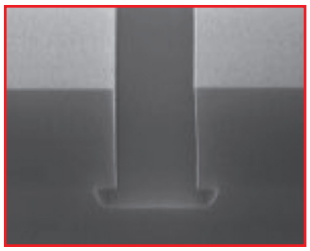


Recommended Process Conditions		
	*1.1 µm to 4.0 µm Thickness**	*1.1 µm to 10.0 µm Thickness**
Thickness: Softbake: Expose: PEB: Developer:	1.1 µm – 4.0 µm 115°C/ 90 sec. Contact hotplate ASML PAS 5500/ 200 i-Line (0.48 NA, 0.50 σ) 115°C/ 90 sec. Contact hotplate MF™- 24 A @ 21°C, 60 sec. single spray puddle	1.1 µm – 10.0 µm 30 sec. step down to 115°C/ 90 sec. Contact hotplate** ASML PAS 5500/ 200 i-Line (0.48 NA, 0.50 σ) 115°C/ 90 sec. Contact hotplate MF™- 24 A @ 21°C, 60 sec. single spray puddle

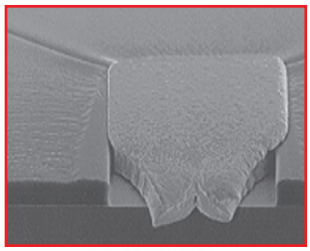
* Recommended for isolated spaces as well ** Refer to datasheet for further details



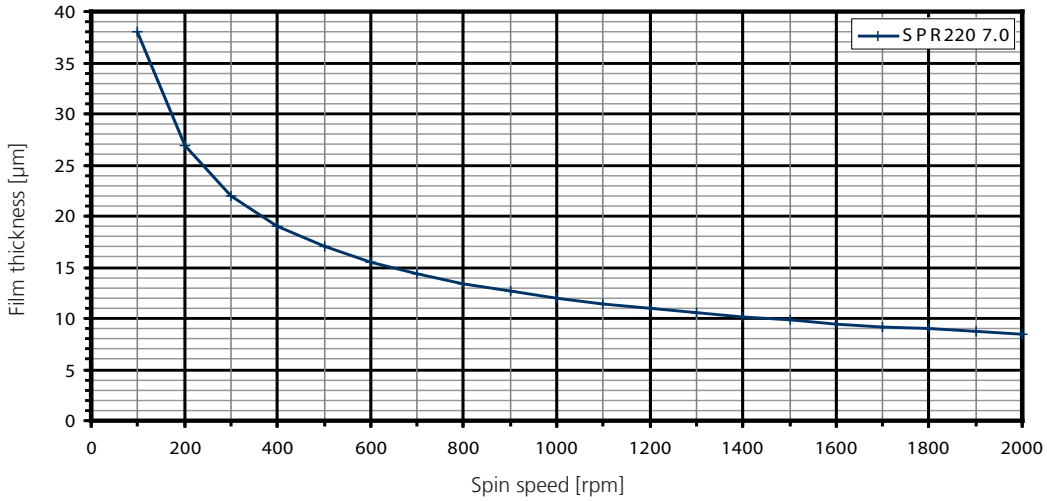
Etch trenches (Bosch Process)
4 to 10 µm features
(up to 100 µm deep)



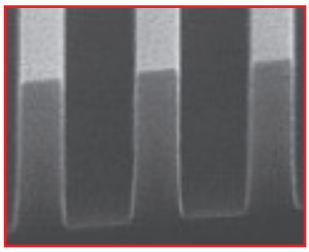
Wet wafer etch (1:5 HF 5 min)
2 µm features



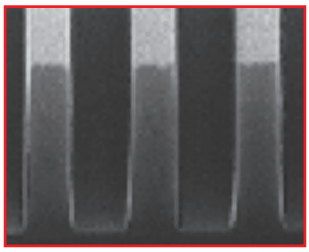
40 µm SPR220 over-plate with Au



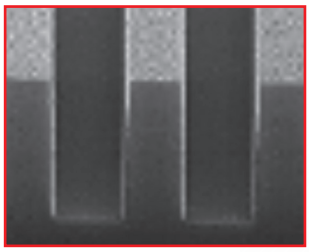
Resist	SPR700-1.8M	SPR700-1.8	SPR700-1.2 L	SPR700-1.2	SPR700-1.0
Film thickness @ 4000 rpm	1.8 µm	1.8 µm	1.2 µm	1.2 µm	1.0 µm
Viscosity / cSt	34.1	35.1	18.3	18.3	14.1
Dose (i-line)	270 mJ	190 mJ	160 mJ	140 mJ	130 mJ



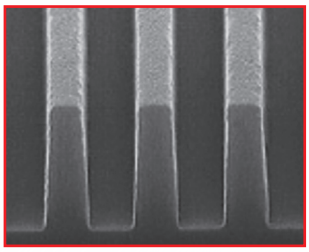
1.8 µm FT/ 0.6 µm L/S 270 mJ (1.8M)



2.2 µm FT/ 0.6 µm L/S 197 mJ

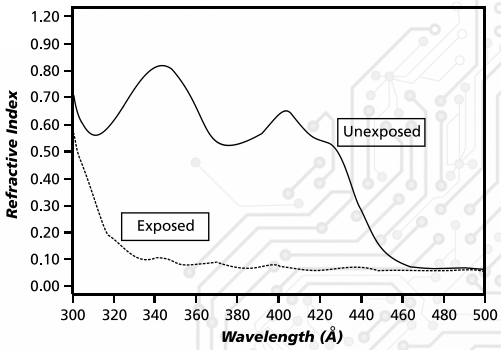


1.2 µm FT/ 0.5 µm L/S 134 mJ



0.968 µm FT/ 350 nm L/S 135 mJ

Absorbance Curve SPR700



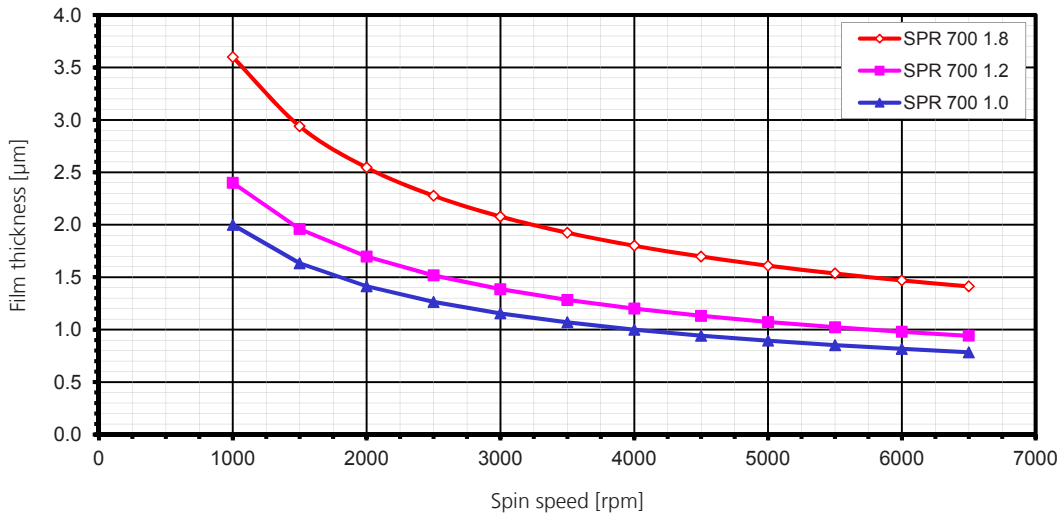
SPR700

For Microlithography Applications

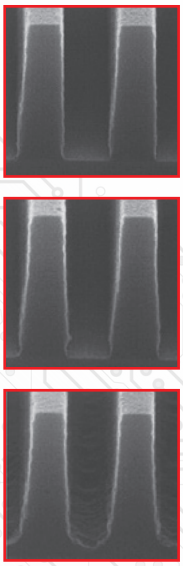
MEGAPOSIT SPR700 series photoresists are positive multiwavelength photoresists that are optimized to provide robust process latitudes and high throughput with excellent thermal stability. SPR700 resists are compatible across a wide variety of developer families. This versatility makes SPR700 photoresists ideal for a number of applications, especially mix and match lithography.

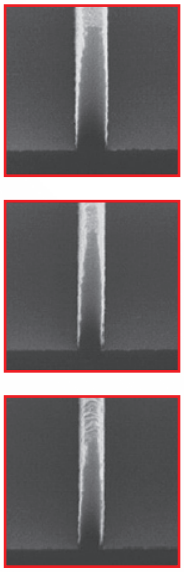
Advantages

- Multiwavelength (i-line, g-line and broadband)
- Compatible across a wide variety of developer families (0.26N,0.24N, 0.21N)
- Excellent process latitudes and robust process
- Thermal stability greater than or equal to 135°C
- High throughput for stepper and developer process
- Excellent DOF

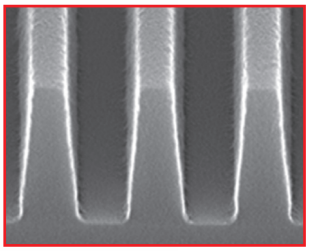


Resist	SPR660-1.5	SPR660-1.2	SPR660-1.0(M)	SPR660-0.8
Film thickness @ 3200 rpm	1.5 µm	1.2 µm	1.0 µm	0.8 µm
Viscosity / cSt	17.6	13.06	10.4	8
Dose (i-line)	250 mJ	210 mJ	180 mJ	150 mJ

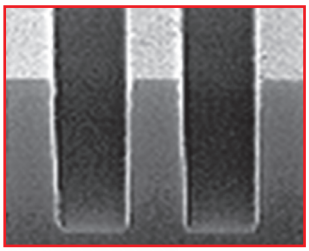




SPR660 – 1.0 (1.08 µm FT)



SPR660 1.0M, 0.977 µm FT/
0.35µm L/S, 202 mJ



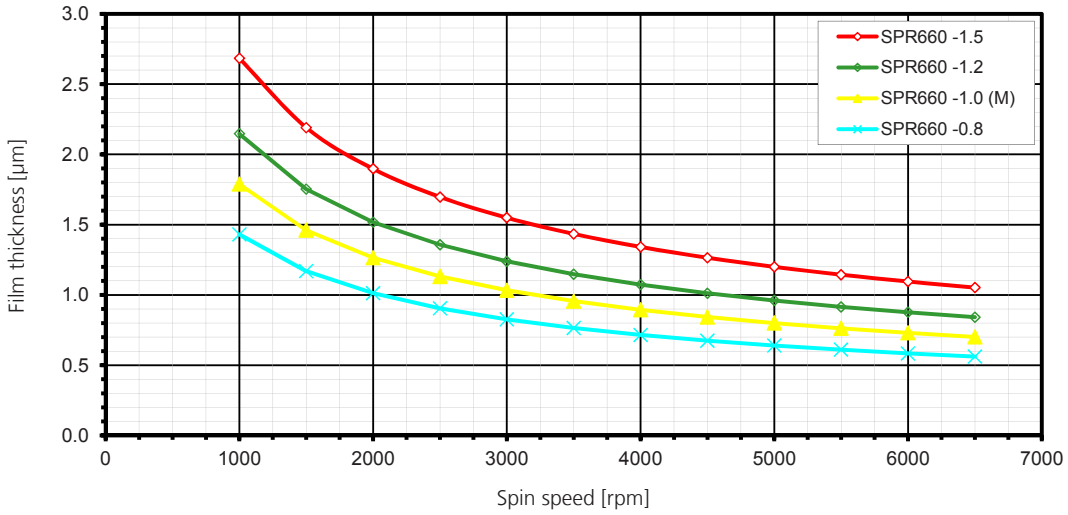
0.97 µm FT/ 350 nm L/S,163 mJ

SPR660
For Microlithography Applications

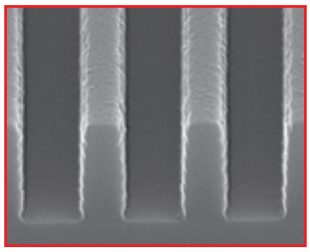
SPR660 series is an advanced i-line photo-resist designed for processing 0.350 micron features and larger. SPR660 performs in both line / space and contact hole application and on variety of substrates, including silicon dioxide, titanium nitride, and organic anti-reflectant coatings. The SPR660 product family includes a range of undyed dilutions as well dye loadings for improved processing over reflective surface.

Advantages

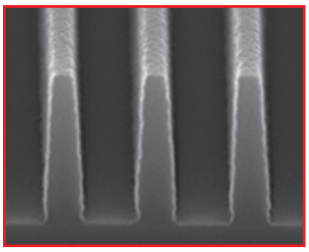
- Linear resolution
  - 0.325 µm over silicon substrate
  - < 0,300 µm over anti-reflectant
- Wide process latitudes
  - DoF 1,5 µm for 0,4µm lines / Spaces
  - DoF 1,2 µm for 0,4µm contact holes
- Compatible with 0.24N and 0.26N developer
- 12 month shelf life



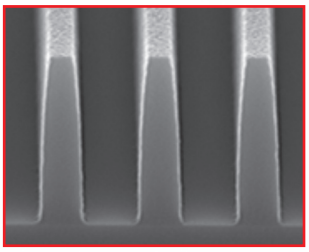
Resist	SPR955-CM-3.0	SPR955-CM-2.1	SPR955-CM-1.8	SPR955-CM-1.4	SPR955-CM-1.1	SPR955-CM-0.9	SPR955-CM-0.7
Film thickness @ 3000 rpm	3.0 µm	2.1 µm	1.8 µm	1.4 µm	1.1 µm	0.9 µm	0.7 µm
Viscosity / cSt	63.6	34.3	28.6	19	14.3	11.2 µm	8.5
Dose (i-line)	415 mJ	238 mJ	210 mJ	197 mJ	173 mJ	165 mJ	157 mJ



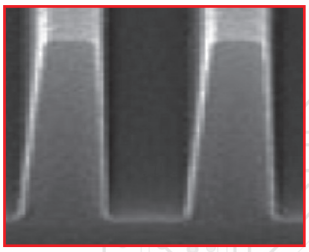
0.76 µm FT/ 350 nm L/S 160 mJ



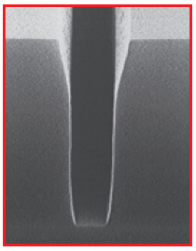
1.08 µm FT/ 280 nm L/S 170 mJ



1.5 µm FT/ 0.4 µm L/S 197 mJ

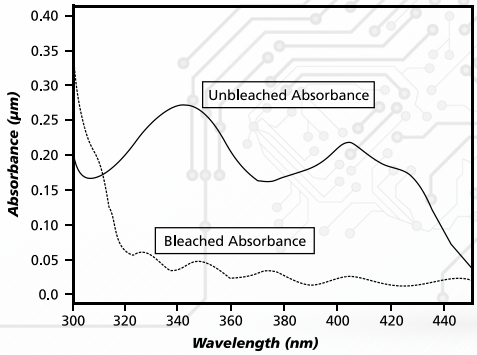


1.8 µm FT/ 450 nm L/S 205 mJ



5.0 µm FT/ 0.8 µm L/S 800 mJ

Absorbance Curve SPR955-CM



SPR955-CM

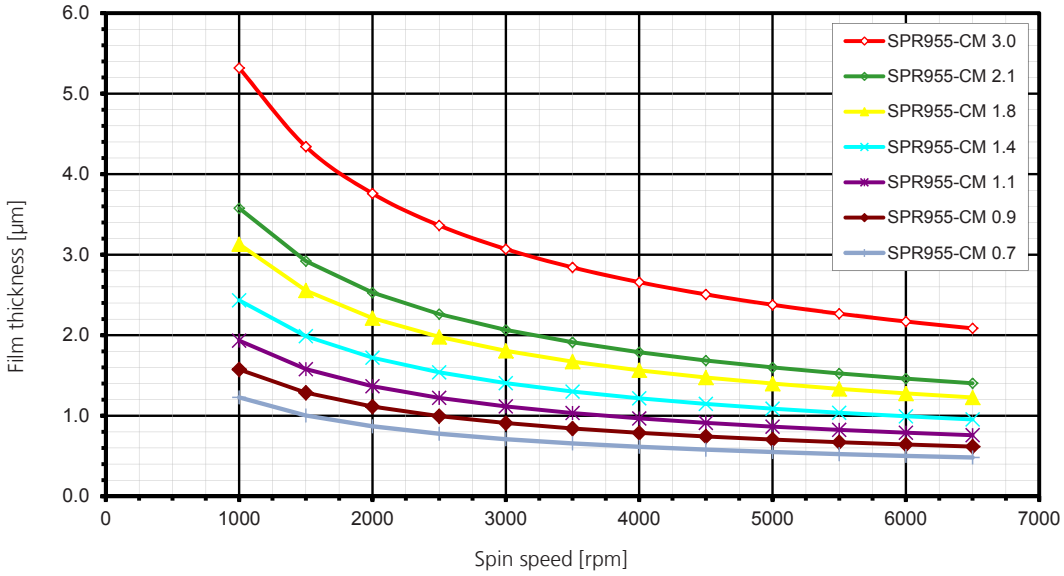
For Microlithography Applications

MEGAPOSIT SPR955-CM series photoresist is a general purpose, high – throughput, i-line photoresist for **0.35 µm** front-end and back-end applications. SPR955-CM is optimized for anti-reflective (organic and inorganic) coating.

Advantages

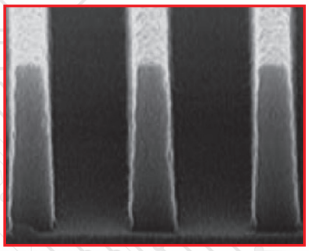
350 nm Design Rules

- Dense Lines/Spaces and isolated lines on polysilicon
- Dense Lines/Spaces in high-aspect ratio film on TiN
- Contact holes on oxide
- Isolated spaces (trenches)



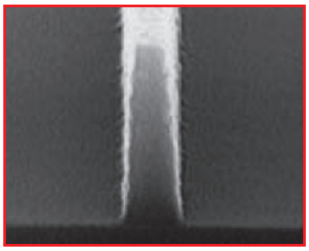
Resist	Ultra-*i* ™123-1.0	Ultra-*i* ™123-0.8	**Ultra-*i* ™123-0.35**
Film thickness @ 2500 rpm	1.0 µm	0.8 µm	0.35 µm
Viscosity / cSt	8.6	6.6	4.09
Dose (i-line)	295 mJ	250 mJ	150 mJ

230 nm 1:1.5 L/S



225 mJ/ cm²

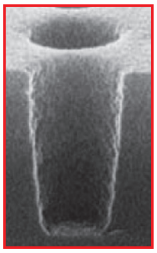
230 nm isolated lines



235 mJ/ cm²

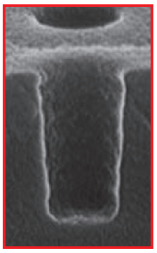
ARL: 1.500 Å XHRi over Si
FT: 7.620 Å
EXP: 0.60 NA, 0.75σ

300 nm 1.1 contact hole



535 mJ/ cm²
FT: 8.650 Å over BPSG
EXP: 0.57 NA, 0.85σ

250 nm wafer, 350 nm mask



345 mJ/ cm²
FT: 7.480 Å over BPSG
EXP: 0.57 NA, 0.85σ

Ultra-*i* ™123

For Microlithography Applications

Ultra-*i* ™123 is an advanced, general purpose, 0.25 µm critical i-line photoresist with extendibility to 0.23 µm and below. Ultra-*i* ™123 is optimized for antireflective coating.

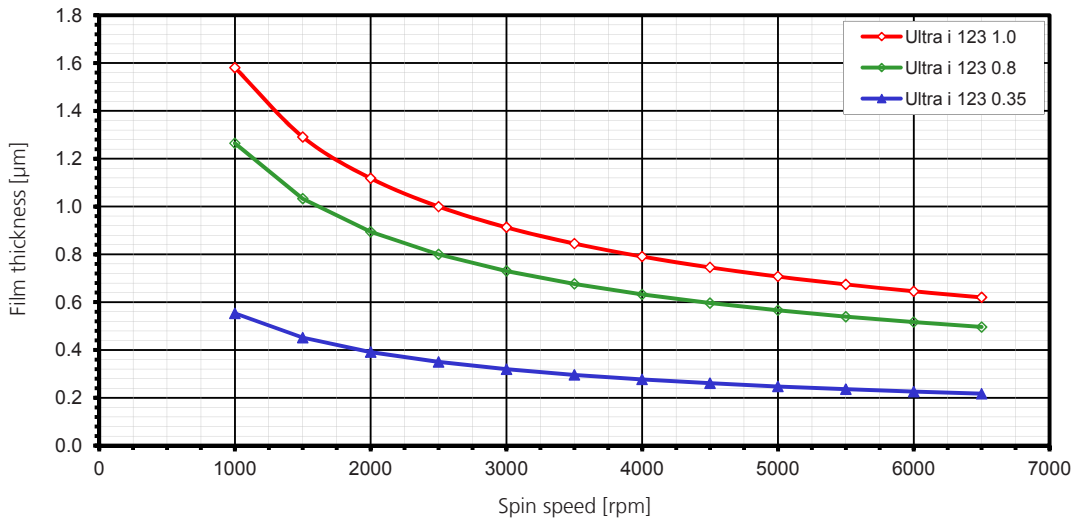
Advantages

Lines / Spaces

- ≥ 1.0 µm DoF @ 0.25 µm dense
- ≥ 1.1 µm DoF @ 0.23 µm semi-dense

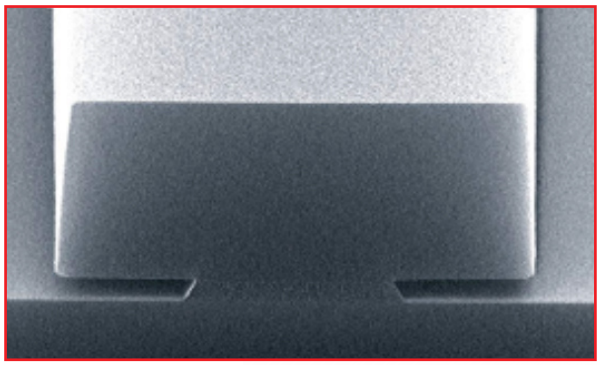
Contact Holes

- ≥ 1.1 µm DoF @ 0.30 µm CH
- ≥ 1.1 µm DoF @ 0.25 mm CH (with PSM)

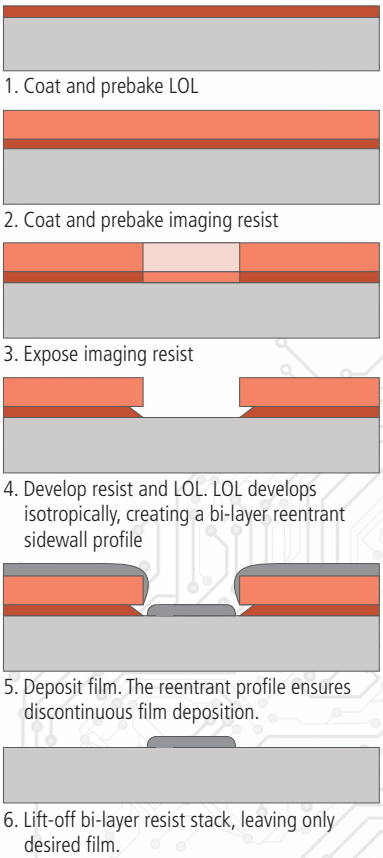


MICROPOSIT LOL 1000 and LOL 2000
For Bi-Layer Lift-Off Processes

Microposit LOL 1000/2000 lift-off layer is an enhanced dissolution rate, dyed PMGI (polymethylglutarimide) solution used for lift-off processes requiring tight CD control, such as GMR thin film head, GaAs, and other leading-edge semiconductor applications. The LOL bilayer lift-off process is suitable for applications where a thin layer of metal is sputtered or evaporated in an additive process. CD variation due to etch bias inherent in substractive processes is eliminated, resulting in superior metal line width control. Attack on the substrates by an etchant is eliminated.



LOL 2000 on Si at 200 °C/ 5 min. with 5.0 micron SPR950



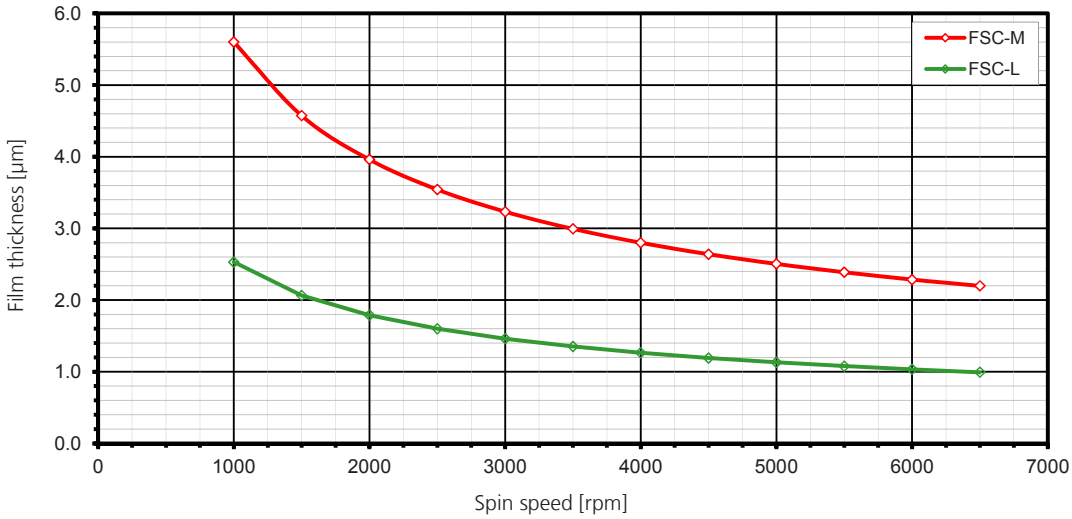
1. Coat and prebake LOL
2. Coat and prebake imaging resist
3. Expose imaging resist
4. Develop resist and LOL. LOL develops isotropically, creating a bi-layer reentrant sidewall profile
5. Deposit film. The reentrant profile ensures discontinuous film deposition.
6. Lift-off bi-layer resist stack, leaving only desired film.

MICROPOSIT FSC – PROTECTIVE SURFACE COATING

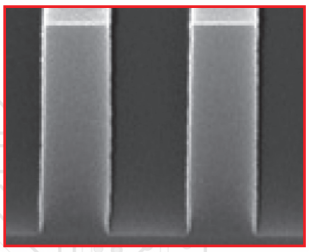
MICROPOSIT FSC series surface coating is a non-imagable coating formulated as a protective coat for use during chemical or mechanical processes in microelectronic fabrication. The system has been formulated with a single solvent. It does not contain xylene, acetone, or Cellosolve acetate.

Microposit FSC Series Surface Coating is available in two thickness ranges.

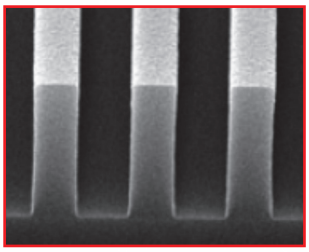
- FSC-L: 1.3 to 1.8 µm
  For wet and dry etch protection 0.2 µm filtration
- FSC-M: 2.4 to 3.3 µm
  For front-side protection during back lapping 0.2 µm filtration



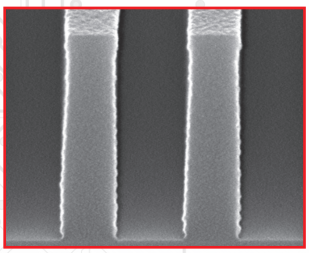
Resist	UV26-3.0	UV26-2.5	UV26-2.0	UV26-1.5	UV26-1.1	UV26-0.85
Film thickness @ 3000 rpm	3.0 µm	2.5 µm	2.0 µm	1.5 µm	1.1 µm	0.85 µm
Viscosity / cSt	112	80	58.4	37	23.75	18.5
Dose (average for L/S)	30 mJ	27 mJ	25 mJ	20 mJ	19 mJ	15 mJ



2.5 µm Ft / 800 nm L/S 25 mJ

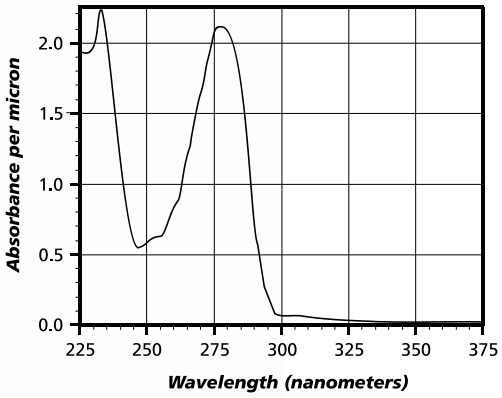


1.8 µm Ft / 600 nm L/S 21 mJ



1.4 µm Ft / 380 nm L/S 19 mJ

Absorbance Curve UV26



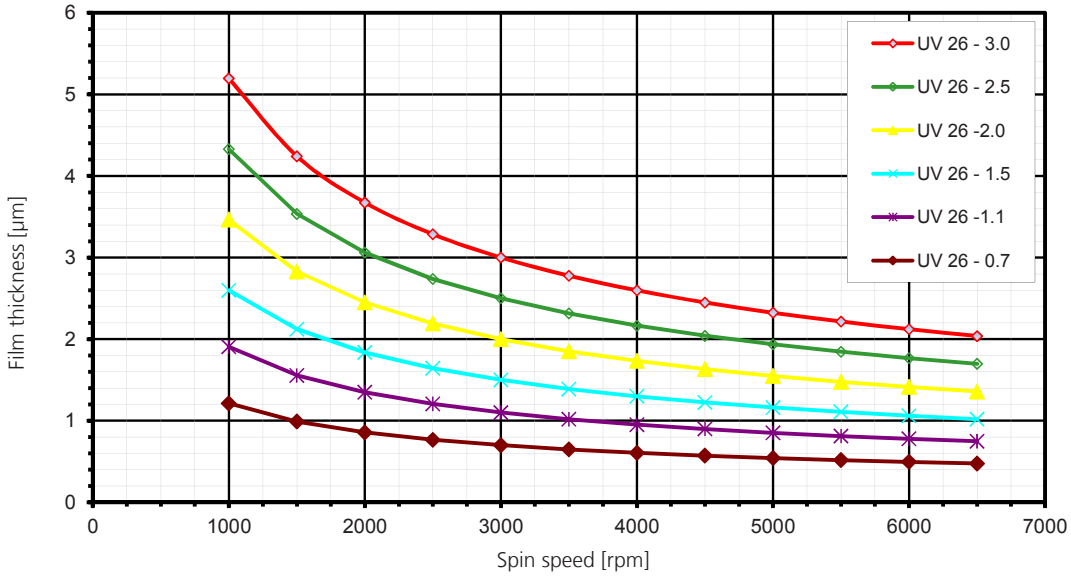
UV26 / UV26G
Description

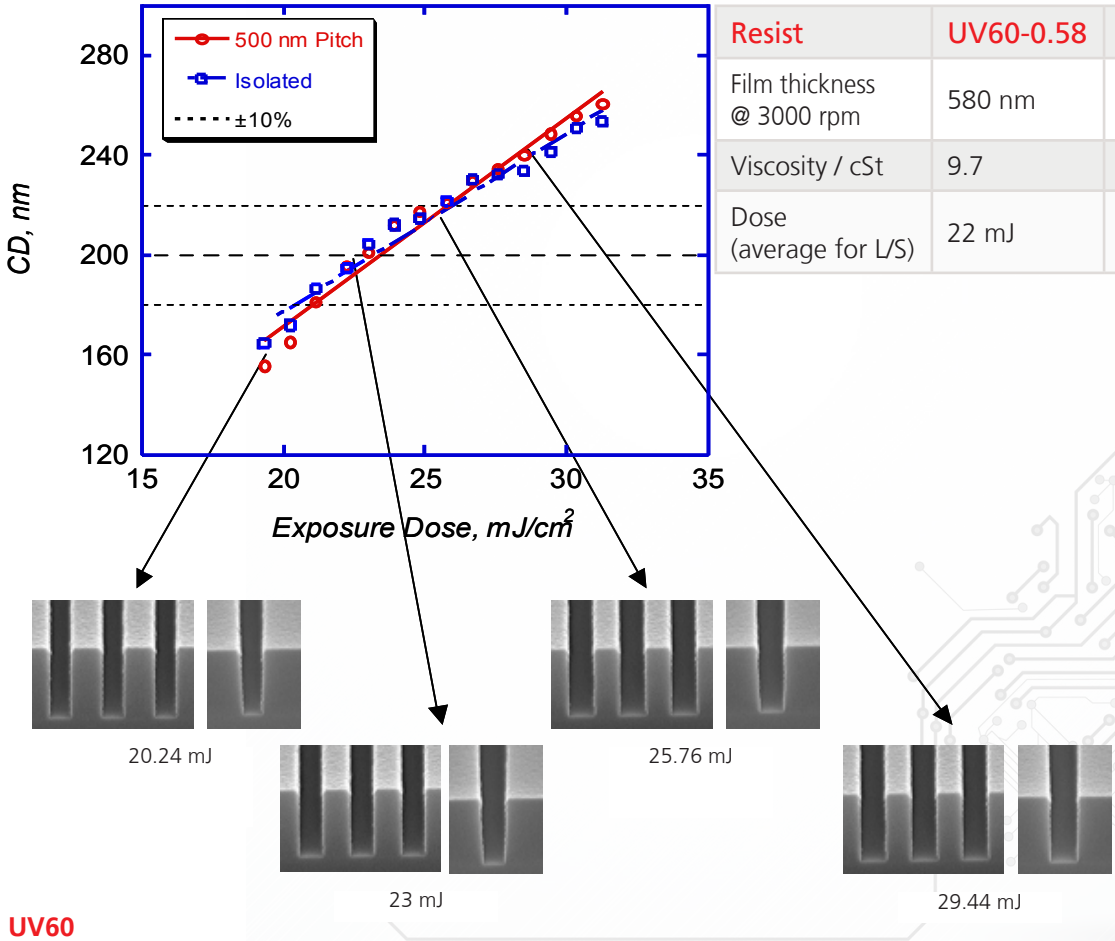
UV26 is a positive DUV photoresist developed for deep Implant applications. The low viscosity of UV26 allows for reduced dispense volume and improved coating. Uniformity for film ranging from 0.7 µm to 3.0 µm. UV26G is the long term "green" replacement of UV26

Features

Sizing Energy⇨DoF⇨Resolution

- 16.5 mJ/cm² for 350 nm 1:1 Lines/Spaces at 1.1 µm FT⇨0.80 µm DoF⇨Resolution 240 nm
- 18.5 mJ/cm² for 450 nm 1:1 trenches at 1.8 µm FT⇨1.35 µm DoF⇨Resolution 280 nm
- 20.5 mJ/cm² for 600 nm 1:1 Lines/Spaces at 2.5 µm FT⇨1.0 µm DoF⇨Resolution 500 nm





Resist	UV60-0.58	UV60-0.75
Film thickness @ 3000 rpm	580 nm	750 nm
Viscosity / cSt	9.7	12.7
Dose (average for L/S)	22 mJ	24 mJ

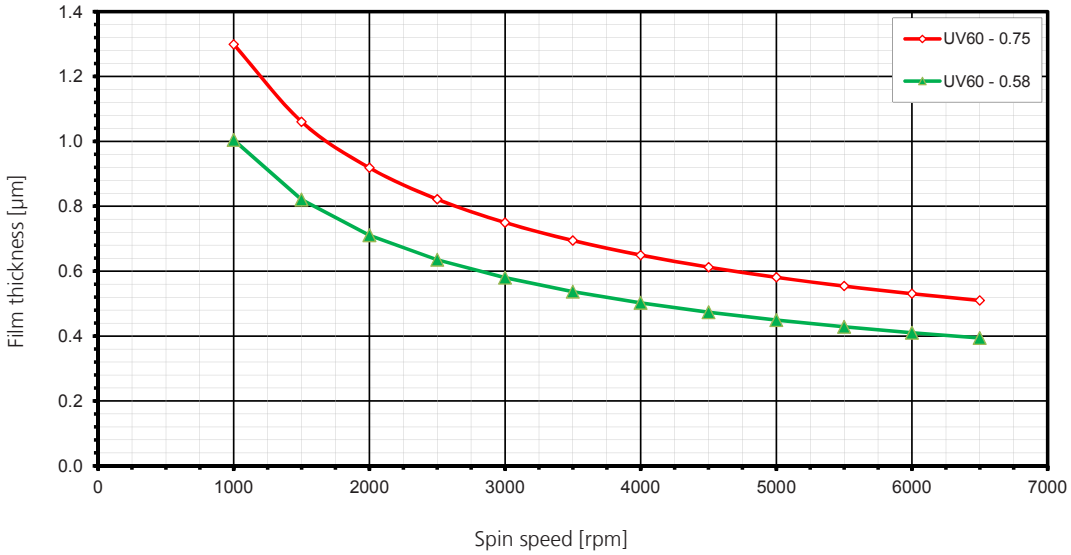
UV60

For Microlithography Applications

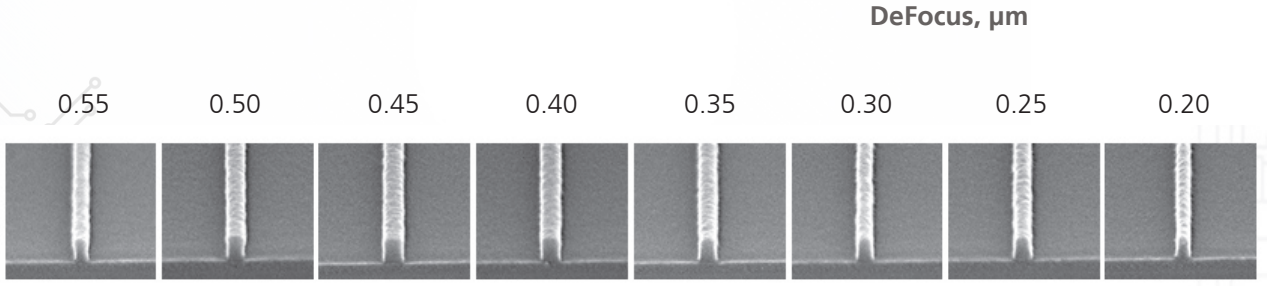
UV60 is a positive DUV photoresist designed for consolidation of implant, metal contact hole and via applications for 200 nm features. UV60 works well on reflective substrates.

Advantages

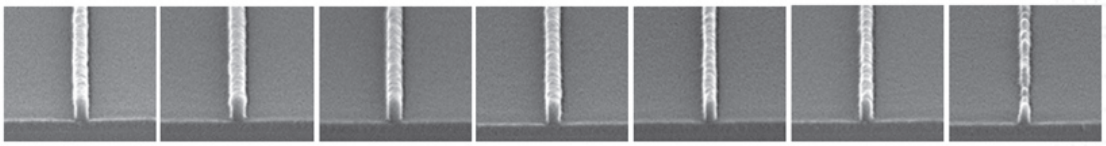
- DoF > 0.5 µm for 200 nm 1:1.25 trenches
- Excellent resolution
- Good exposure latitude
- Vertical profiles



Resist	UV1100-0.38
Film thickness @ 3000 rpm	380 nm
Viscosity / cP	5.9
Dose (for 100nm iso-Line)	43 mJ



100 nm Isolated Lines - Focus Latitude



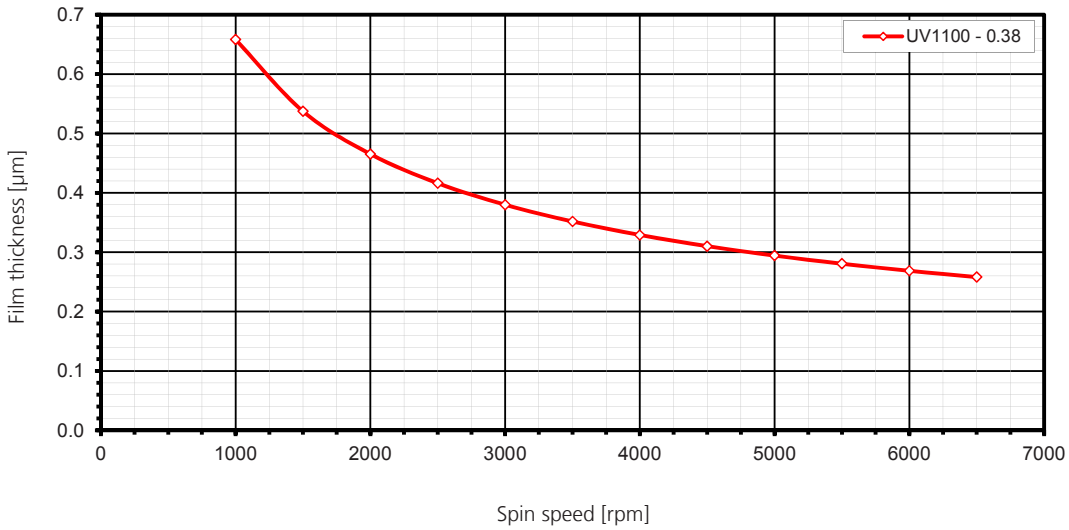
80 nm Isolated Lines - Focus Latitude

UV1100
Description

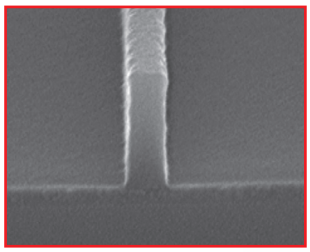
UV1100 is a high temperature, positive DUV resist . UV1100 features excellent resolution and wide process windows for metal and trench application. UV1100 works well on organic anti-reflectant for hard mask processes and is especially suited for metal trench application.

Advantages

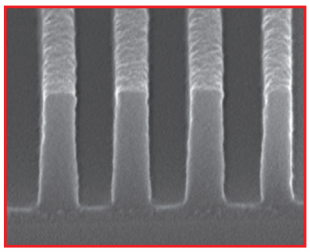
- Low through-pitch bias
- Excellent etch resistance
- Minimal SB/PEB sensitivity
- Good process window
- Good resolution



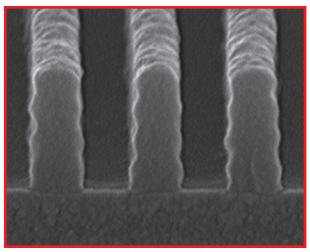
Resist	UV210GS-0.6	UV210GS-0.4	UV210GS-0.3
Film thickness @ 2750 rpm	600 nm	400 nm	300 nm
Viscosity / cSt	13.83	10.07	7.52
Dose (average for L/S)	30 mJ	28 mJ	26 mJ



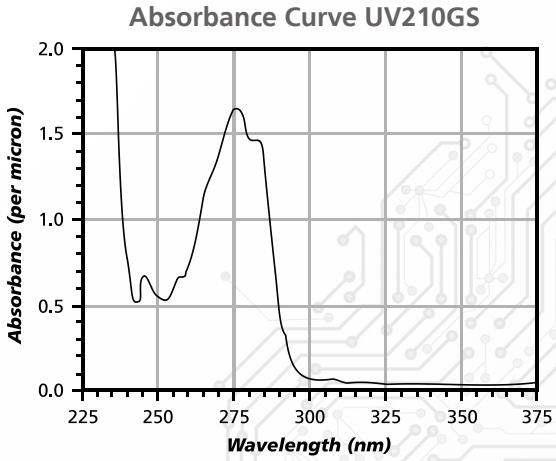
500 nm Ft/ 180 nm L/S



500 nm Ft/ 180 nm L/S



315 nm Ft/ 130 nm/ 220 nm L/S



UV210GS

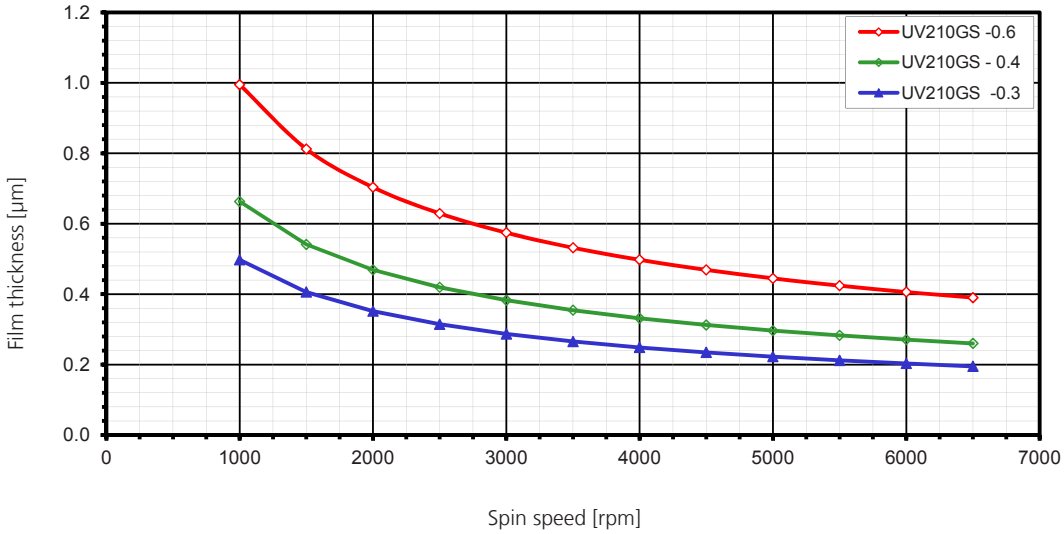
For Microlithography Applications

UV210GS is a multipurpose resist that can be utilized for gate, phase shift mask contact holes and trench applications in 180 – 130 nm CD range.

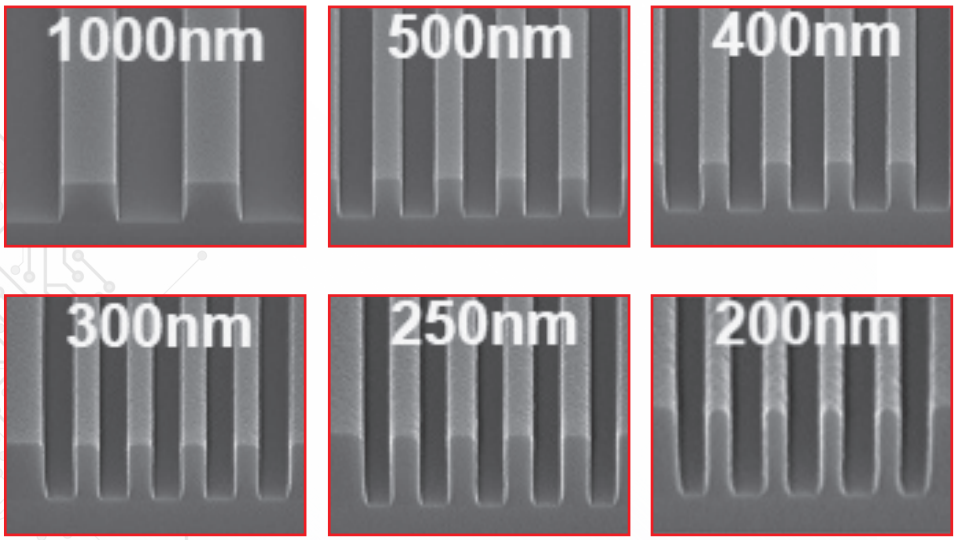
Features

Sizing Energy⇨DoF⇨Resolution

- 28 mJ/cm² for 130 nm 1:1.5 lines / spaces
  ⇨1.0 µm DoF⇨Resolution 130 nm
- 33 mJ/cm² for 180 nm 1:1 trenches
  ⇨0.8 µm DoF⇨Resolution 160 nm
- 60 mJ/cm² for 180 nm 1:1 contact holes
  ⇨0.7 µm DoF⇨Resolution 150 nm (70 nm Bias)



Resist	UVN2300-0.4	UVN2300-0.5	UVN2300-0.8
Film thickness @ 3000 rpm	400 nm	500 nm	800 nm
Viscosity / cSt	3.85	4.77	8.07
Dose (average for L/S)	18 mJ	20 mJ	40 mJ



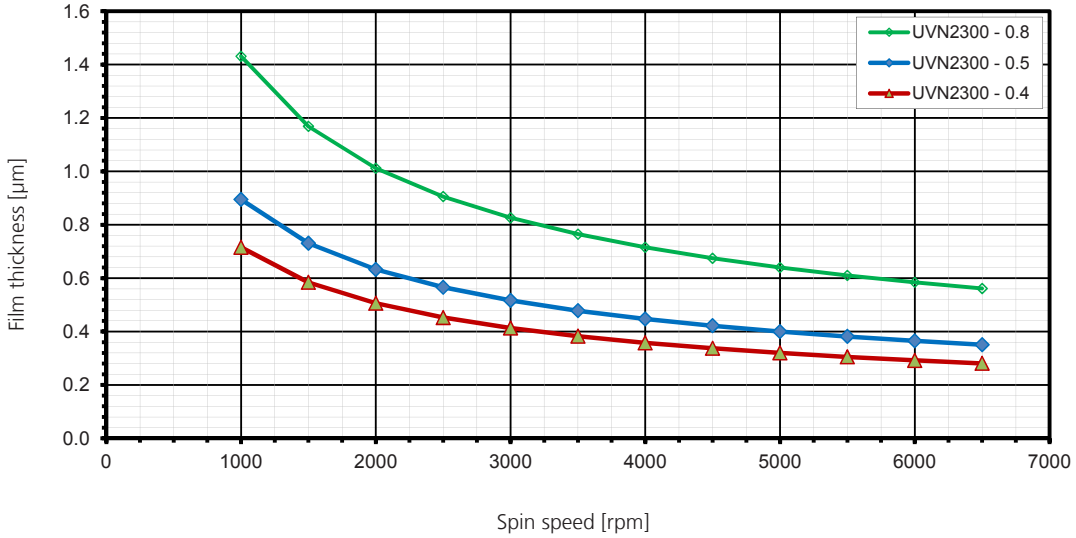
UVN2300
Description

UVN2300 is a negative PFOS-free photoresist for DUV applications. This resist is targeted for fast throughput device production rules down to 150 nm. Nested lines/spaces, isolated lines, posts, and contacts can be resolved with wide process windows. Minimal PEB sensitivity, insensitivity to airborne contaminants, and superior metal etch resistance are only some of the properties UVN2300 offers.

Features

Sizing Energy
- 10.0 – 100 mJ for lines and spaces

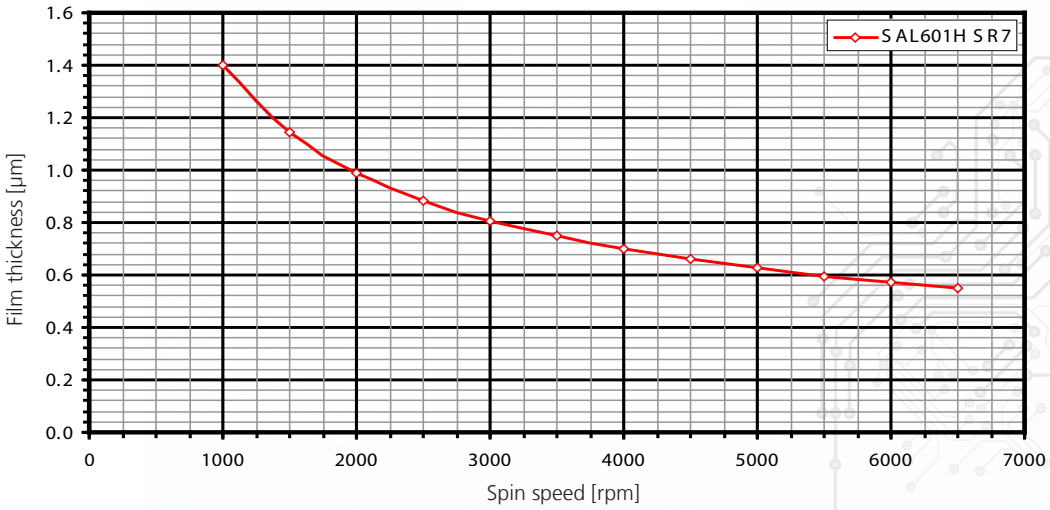
Depth of Focus
- 1.3 µm DoF for 300 nm semi trench
- 1.6 µm DoF for 300 nm 1:1 trenches
- 0.90 µm DoF for 180 nm 1:1 lines/spaces
- 0.80 µm DoF for 150 nm 1:1 lines/spaces
- 0.45 µm DoF for 180nm 1:1 CH



MICROPOSIT SAL601 E-BEAM RESIST has been designed to maximize the throughput and resolution capabilities of electron beam lithography. Its attributes of high sensitivity, greater process tolerance, and easy alignment result in efficient use of expensive equipment. Because this resist is novolac based and aqueous alkaline developable, it is non-swelling, and thus provides greater resolution and critical dimension control.

Companion developers include the metal ion free MICROPOSIT MF-322 Developer, or, for use on aluminium subtrates, MICROPOSIT Developer. Ideal use of the negative-tone SAL601 Resist is in direct-write applications.

Expose:
Approximately 4-12µC/cm² matrix @ 20 keV



MICROPOSIT PRIMER

MICROPOSIT Primers are based upon hexamethyldisilizane (HMDS), a well-known chemical pretreatment for increasing photoresist adhesion to doped and undoped oxides, nitride, polysilicon, glass, quartz and other semiconductor surfaces.

Advantages

- Process consistency
- High purity
- Compatible with all MICROPOSIT and MEGAPOSIT™ photoresists
- Suitable for in-line or batch processing
- Reduced undercutting at wet etch
- Increased yields

Recommended Spin Priming Dilutions		
Surface	Concentration	
	20%	50%
Phosphorous doped oxide		x
undoped oxide	x	
Nitrides	x	
Silicon and polysilicon	x	
Metals	x	

248 nm Anti-Reflectants Product Selection Guide

	Attributes	AR3GSF	AR10L	AR14	AR14H
Minimum Reflectivity	Minimum (1st or 2nd)	1st	1st	1st	1st
	Thickness (nm)	60	60	60	60
ETCH	Bulk Etch Rate (Relative to UV6 Resist)	1.2	1.3	1.3	1.3
	Relative Etch Time (Relative to AR2/3)	1.0	1.0	1.0	1.0
Coating	Conformal	●	●		
	Planar & Via fill			●	●
Resist Compatibility	ESCAP Resists	●	●	●	●
	Acetal/ Hybrid		●	◐	

● compatible ◐ some compatible

Developers

Metal Ion Free (MIF)

(recommended where it is desirable to avoid a potential source of metal ion contamination)
MF-20A Series – MF-21A (0.21N), MF-24A (0.24N), MF-26A (0.26N), MF-28A (0.28N)
MF-300 Series – MF-319 (0.237N), MF-321 (0.21N), MF-322 (0.268N)
MF-CD-26 Developer – (0.26N, surfactant-free)

Metal Ion Bearing (MIB)

Microposit 351 Developer (1.39N) – concentrate
Microposit 303A Developer (1.7N) – concentrate
Microposit Developer (0.6N) – concentrate, lowest attack on Aluminum
Photoposit 160 Developer (0.6N) – concentrate

		SP25 G2	S1800 G2	SPR350 SPR3000	SPR220	SPR700	SPR660 SPR680 SPR955CM	ULTRA-i 123	UV26G UV60 UV210GS UV1100	UVN2300	SAL601H
MIF	MF-20A	■	■	■	■	■	■	■	■	■	■
	MF-300	■	■	■	■	■	■	■	■	■	■
	MF-CD-26	■	■	■	■	■	■	■	■	■	■
MIB	351 Dev	■	■	■	■	■	■	■	■	■	■
	303A Dev	■	■	■	■	■	■	■	■	■	■
	Micro Dev	■	■	■	■	■	■	■	■	■	■
	Photop. 160	■	■	■	■	■	■	■	■	■	■

■ recommended ■ possible ■ not recommended

Edge Bead Removers EBR EC Solvent, EC Solvent 11	**Resist Remover Specialty Applications** SRX-400	**General Purpose Resist Remover** SVC-14, 1165, 1112A,
Resist and Polymer Remover - Batch Processing SVC-175	**Polymer Remover Aluminum - Batch Processing** ARS-425	**Polymer Remover Aluminum - Single Wafer Processing** PRX-505

CHROME ETCHANT 18

Chrome Etchant 18 is designed for use in micro-lithographic applications where high reproducibility and tight dimensional control is required. The ready-to-use solution, which is based on acidic ceric salts, is stable and compatible with positive and negative resist systems.

The principle application is mask manufacture in microelectronic industry for etching bright and anti-reflective chrome thin-films on mask blanks. Other applications are in thin-film technology, (thin film circuitry, optical gratings, microelectronic devices, etc) for etching chromium, chrome-nickel alloys, molybdenum and tungsten films.

PHYSICAL & CHEMICAL PROPERTIES:	Specific Gravity at 20/ 20°C	: Approx. 1.140
	Colour	: Orange
	Turbidity	: Clear
	Ceric Content	: Approx. 40 g/l
	Total Acid Normality	: Approx. 1.90 N

micro resist technology develops and produces photoresists and materials for advanced lithography and nano-imprint lithography as well as hybrid polymers for microoptical applications.
The products of micro resist technology are mainly used in MEMS applications, in the semiconductor industry, in optoelectronics, in new data storage media, and in nano-technology. Over 50 % of the turnover is achieved through exports. A world-wide network of distributors supports this.

Additionally to the own products micro resist technology has distribution contracts with DOW Chemicals (USA), MicroChem Corp. (USA), and DuPont (USA).
micro resist technology's customer services range from lithographic patterning of customers' substrates to the on-site introduction into production.

One of the essential criteria for success is the technological advice for the product applications by the company's scientists. micro resist technology puts a high priority on the consistent implementation of quality management methods. It has had a quality management system certified to DIN EN ISO 9001 since 1997 and to DIN ISO 14001 since 2011.

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ISO 9001
ISO 14001

micro resist technology's products are:

- Polymers for Nanoimprint Lithography
- (Hybrid Polymers) (ORMOCER®s) for micro-optical applications
- Photoresists for Deep-UV and Electron-beam Lithography
- Photoresists and Photopolymers for UV, Laser and X-ray Lithography
- Customer Services

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micro resist technology

micro resist technology GmbH
Gesellschaft für chemische Materialien spezieller Photoresistsysteme mbH

Köpenicker Str. 325
12555 Berlin
Germany

fon: +49 30 641670 100
fax: +49 30 641670 200
mrt@microresist.de
www.microresist.com

General Manager:
Dipl. Chem. Gabi Grützner

others:
V.A.T. No.: DE 157534120

Jurisdiction:
Amtsgericht Berlin
Handelsregister 96 HBR 47424

technical realization and design:

micro resist technology GmbH
Liane Strauch
l.strauch@microresist.de

micro resist technology

DOW®

Electronic Materials

official distributor in europe

For further information please contact:

micro resist technology GmbH
Köpenicker Straße 325
12555 Berlin, Germany

fon: +49 30 641670 100
fax: +49 30 641670 200

sales@microresist.de
www.microresist.com