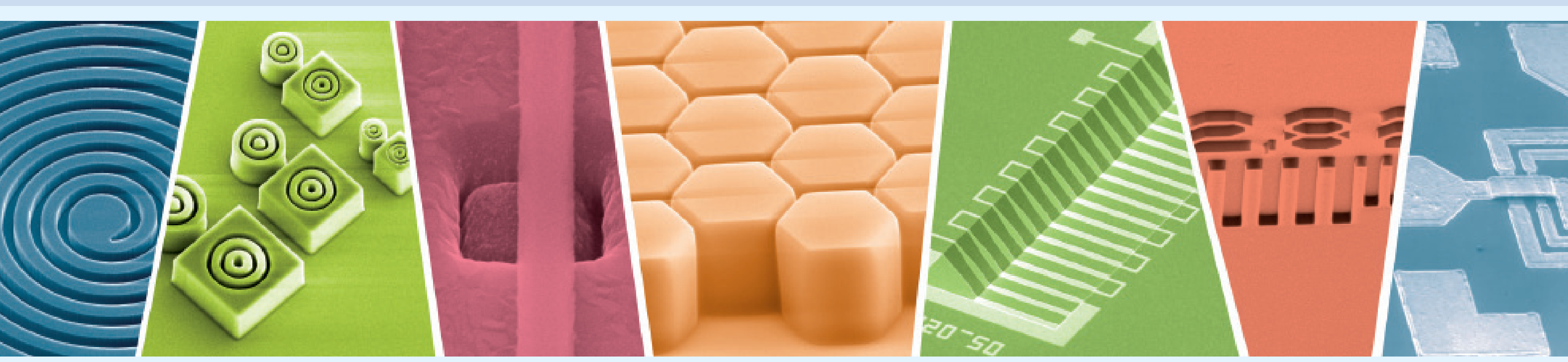
Product information

PROCESS CHEMICALS



THE ALLRESIST GMBH

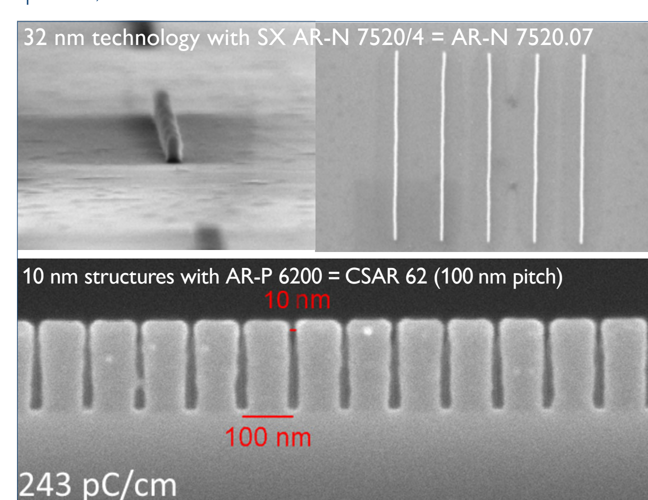
Company for chemical Products

The executive board Brigitte und Matthias Schirmer with daugther and successor Ulrike Schirmer

The company is represented worldwide with an extensive product range. In addition to our standard products, we also manufacture customer-specific products on request.

Allresist furthermore develops innovative products for future-oriented technologies like e.g. microsystems technologies and electron beam lithography. In these constantly growing markets, top-performance resists with high sensitivity and a high resolution are in strong demand.

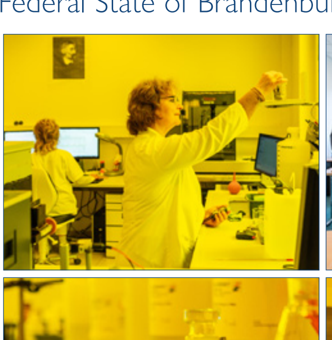
Our newly developed e-beam resists CSAR 62 and Medusa 82 meet these demands, pushing forward innovative technologies with their excellent properties. With Electra 92 as top layer, e-beam resists can be processed also on insulating substrates like glass, quartz, or GaAs.



The Allresist GmbH offers a wide range of resists and process chemicals for all standard applications of photo and e-beam lithography which are required for the fabrication of electronic components.

As independent resist manufacturer, we develop, produce and distribute our products worldwide. On the market since 1992, Allresist benefits from a comprehensive know-how gained in 30 years of resist research, and fabricates products with highest quality (ISO 9001).

As chemical company, we are particularly aware of our obligation to a healthy environment. A responsible and protective resource management and voluntary replacement of environmentally hazardous products is living politics for us. Allresist is environmentally certified (ISO 14001) and environmental partner of the Federal State of Brandenburg.



Our flexible approach to customer's demands, together with effective production technologies, allows us to provide fast availability which results in very short delivery times, small packaging sizes from ¼ l onwards, 30 ml test samples as well as an individually tailored advisory service.

Allresist received a number of awards for scientific and economic top performance (technology transfer prize, innovation award, customer's champion, quality award and Ludwig-Erhard-prize).

Interesting news and further information for you are compiled on our web page where you will find answers to many questions in our resist-WIKI and the FAQ.

WWW.ALLRESIST.COM

OUR NEWS

for Microstructuring

2017 - 2020

Three further important new developments in principle allow new resist applications: very stable negative resist **Atlas 46** (AR-N 4600, comparable to SU-8), thermally structurable **Phoenix 81** (AR-P 8100, nanofrazor), and high-resolution **Medusa 82** (SX AR-N 8200, comparable to HSQ). Medusa 82 has higher storage stability than HSQ. The sensitivity can be increased by up to 20 times by a post exposure bake or an addition of acid generators. Currently under development is a variant that can also be processed with broadband UV.

The ready-to-use spray resists AR-P 1200, AR-N 2200 are used to evenly cover vertical trenches, for etched 54 ° slopes, and for spin coating.

2016

AR-PC 5090 and 5091 were specifically developed for the efficient dissipation of electrical charges during e-beam lithography on insulating substrates. The new, highly conductive protective coatings can be applied on PMMA, CSAR 62, and HSQ as well as on novolac-based e-beam resists and are removed easily and completely after the process. **Electra 92** can furthermore be used as a replacement for metal vapour deposition in SEM images.

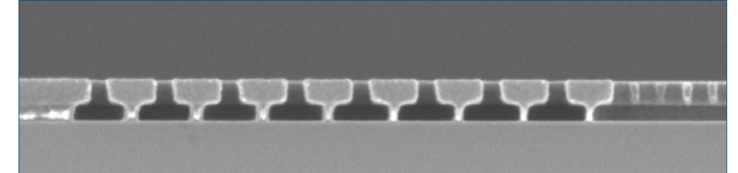
2014, 2015

Due to the classification of the raw material NEP which is contained in removers AR 300-70 and 300-72 as toxic for reproduction, Allresist now introduced the less harmful new remover **AR 300-76** with respect to dissolving power.

Additional eight PMMA solids complement the PMMA product portfolio which now comprises 43 solids contents.

2013

The new 5 µm-resist **AR 4400-05** completes the CAR series 44 and represents an efficient alternative to SU-8. The possible film thickness values now range from 2.5 µm to 100 µm.



Structures with extreme undercuts is possible: 22 nm structures with two-layer system AR-P 6200 / AR-P 679.03

The new remover **AR 600-71** is already at room temperature particularly efficient for the removal of e-beam- and photoresist films baked at higher temperatures.

The new electron beam resist **CSAR 62** is a further development of the well-known ZEP resists. This copolymer on the basis of methyl styrene-co-α-chloromethacrylate with addition of halogenated acid generators ensures a high sensitivity and excellent resolution, a steep contrast as well as excellent plasma etching stability.

With different developers, a resolution of up to 10 nm and sensitivities of about 10 µC/cm² can be realised. If used in a two-layer system with PMMA, the fabrication of smallest.

2012

With the new e-beam resist **AR-N 7520/4** (replacing resist AR-N 7520 new), Allresist introduces a high-resolution and at the same time sensitive new resist onto the market. In contrast to currently available e-beam resists, this resist is characterised by a 7-fold higher sensitivity. The dose to clear a 100-nm layer reduces the writing times at 30 KV to 35 µC/cm².

18 new anisole-PMMA resists AR-P 632…672 of types 50K, 200K, 600K and 950K complement the current anisole PMMA resist palette which also, just like the chlorobenzene PMMAs, meet the high demands of e-beam lithography.

2011

Other new products are polyimide resists which are temperature-stable up to 400 °C: protective coating **SX AR-PC 5000/80** and the positive resist **AR-P 5000/82**.

Currently still in development

We work with high pressure to develop a positive, highly sensitive CAR E-beam resist **EOS 72 (alternative to FEP 171).**

With **our new fluorescent and coloured resists,** new applications in microbiology and optics arise. Dyes or quantum dots illuminate the structures.

The bottom resists of the AR-BR 5400 series have been optimised for the technological requirements of some large customers. They are used as a lower layer in a two-layer system (photoresist on top), especially for lift-off applications.

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Thinner for AR resists

AR 300-12, 600-02, 600-07, 600-09 thinner

For adjusting the film thickness of photoresists and e-beam resists

Characterisation

- ultra-filtered, colourless, high-purity organic solvent mixtures
- adjustment of resist film thickness by defined dilution:
  AR 300-12 for photoresists, AR 600-02…09 for e-beam resists
- edge bead removal of coated substrates as well as cleaning of equipment
- AR 300-12: removal of photoresist films tempered at up to 150 °C and of non-tempered e-beam resist films

Properties

safer solvent

Parameter / AR	300-12	600-02	600-07	600-09
Main component	PGMEA	anisole	methoxypropanol	ethyl lactate
Density at 20 °C (g/cm^3)	0.970	0.990	0.960	1.036
Refractive index at 20 °C	1.402	1.517	1.403	1.413
Water content max. (%)	0.1			
Non-volatiles max. (%)	0.002			
Flash point (°C)	42	44	38	46
Filtration (µm)	0.2			
Suitable for dilution of AR photoresists	3000, 4000, 5000	-	-	-
Suitable for dilution of AR e-beam resists	6510, 7000	632, 642, 662, 672, 6200	617	639, 649, 669, 679
Storage 6 month (°C)	10-22			

Application properties

Dilution is performed as follows: I. placing of defined amount of resist, 2. addition of defined amount of thinner, 3. homogenisation by stirring (both liquids should be mixed quickly), and 4. fine filtration (0.2 µm).

Information on dilution

Higher dilutions of resists may cause gel formation of the polymers which leads to particle deposition in the resist film during the coating step. Diluted resists should therefore be subjected to ultra-filtration (0.2 µm) prior to use. In most cases it is more advantageous to adjust the desired film thickness by varying the spin speed or to utilise a pre-adjusted resist. Special adjustments of thickness values are possible on request for an additional charge.

Formula for dilutions

Example: Starting with a resist with 35 % solids content (AR-P 3510), a solids content of 31 % is desired. Requested is the amount of thinner AR 300-12 in g which has to be added to 100 g resist with 35 % solids content (mass m in g, solids content c /100).

$$m_{thinner} = \frac{m_{resist}\,(c_{resist} - c_{desired})}{c_{desired}} = \frac{100.0\text{ g }(0.35 - 0.31)}{0.31} = 12.9\text{ g thinner}$$

If 100.0 g resist (35 % solids content = AR-P 3510) are diluted with 12.9 g thinner in defined manner, 112.9 g diluted resist (31 % solids content = AR-P 3540) will be obtained.
With this dilution, the film thickness is reduced from 2.0 to 1.4 µm at a spin speed of 4000 rpm.

Developer for AR resists

AR 300-26 and AR 300-35 buffered developers

For the development of photoresists and novolac-based e-beam resist films

Characterisation

- buffered, colourless aqueous-alkaline solutions for photoresist development with low dark erosion
- AR 300-26 high contrast, steep edges, fast development, particularly suited for thick films
- AR 300-35 universal, wide process range for layers up to 6 µm

Properties

Parameter / AR	300-26	300-35
Normality (n)	1.10	0.33
Density at 20 °C (g/cm^3)	1.06	1.02
Filtration (µm)	0.2	
Storage temperature (°C)	10-22	

Development recommendations

optimally suited | suited

AR-resists / main component(s)	AR 300-26 sodium borate and NaOH	AR 300-35 sodium metasilicate /-phosphate
Application / conditions	immersion, puddle and spray development 21-23 °C ± 0.5 °C, approx. 40-60 s (max. 120 s)	immersion, puddle development 21-23 °C ± 0.5 °C, approx. 40-60 s (max. 120 s)
AR-P 3210	1 : 3	undil. to 10 µm
AR-P 3220	2 : 1 ; 2 : 1 to 3 : 2	- ; -
AR-P 3510, 3540 ; 3510 T, 3540 T	1 : 5 ; 1 : 2	1 : 1 ; undil.
AR-P 3740	1 : 3	4 : 1
AR-P 5320 ; 5350	2 : 1 to 3 : 2 ; 1 : 7	- ; 1 : 2
AR-BR 5460, 5480	1 : 4	1 : 1
AR-N 4340	1 : 1	- ; undil.
AR-N 7500.18 ; 7500.08	1 : 4 ; 1 : 7	4 : 1 ; 1 : 2
AR-N 7520.17 ; 7520.11, .07 new	3 : 1 ; 1 : 1	-
AR-N 7520.18 ; 7520.073	2 : 3 ; 1 : 3	2 : 1 ; pur
AR-N 7700.18 ; 7700.08	2 : 1 ; 1 : 3	undil. to 3 : 1
AR-N 7720.30 ; 7720.13	1 : 2 ; 1 : 3	-

Information on developer processing (applies to buffered developer and TMAH developers)

Higher developer concentrations result in a formally higher light-sensitivity of the resist-developer system, thus minimising the required exposure intensity, reducing the development times and allowing for a high throughput in production. It must however be taken into account that an increased dark erosion is associated with stronger developers which successively attacks unexposed structures. More diluted developers provide, depending on the kind of resist, higher contrast and reduce the thickness loss in unexposed or only partly exposed interface areas even with longer development times. This particularly selective working method ensures a high degree of detail reproduction, while the intensity required for exposure is inevitably increased at the same time. To obtain a high contrast, more diluted developer and longer development times are recommended. Substrates have to be rinsed in deionised water immediately after development until complete removal of all residual developer, and are subsequently dried.

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Developer for AR resists

AR 300-40 metal ion-free developer

For the development of photoresists and novolac-based e-beam resist films

Characterisation

- metal ion-free aqueous-alkaline solutions for the processing of photo/ e-beam resists
- reduce the risk of metal ion contamination at the substrate surface
- residue-free development
- metal ion content < 0.1 ppm
- main component TMAH

Properties

Parameter / AR	300-44	300-46	300-47	300-475
Normality (n)	0.26	0.24	0.20	0.17
Density at 20 °C (g/cm3)	0.99			
Surface tension (mN/m)	32 max.			
Filtration (µm)	0.2			
Storage temperatre (°C)	10-22			

Development recommendations

(optimally suited / suited)

AR-resists		AR 300-44	AR 300-46	AR 300-47	AR 300-475
Applications / conditions		immersion, puddle and spray development 21-23 °C ± 0.5 °C, approx. 40 - 60 s (max. 120 s)			
AR-P 1200, AR-N 2200	photoresists	2 : 1 to 3 : 1	-	-	-
AR-P 3110, 3120, 3170	photoresists	-	-	6 : 1 to 3 : 1	-
AR-P 3510, 3540 ; 3510 T, 3540 T	photoresists	- ; undil.	-	1 : 1 ; -	-
AR-P 3740	photoresists	-	undil.	pure	-
AR-BR 5460, 5480	photoresists	-	-	1 : 1	-
AR-N 4340	photoresists	-	-	-	undil.
AR-N 4400-10	photoresists	-	-	3 : 2 to undil.	-
AR-N 4400-25	photoresists	1 : 1	5 : 1 to undil.	undil.	-
AR-N 4400-50	photoresists	8 : 1 to undil.	undil.	-	-
AR-N 7500.18 ; 7500.08	e-beam resists	-	-	4 : 1	-
AR-N 7520.17 ; 7520.11, .07 new	e-beam resists	-	undil.: .17., .11	undil.: .07	-
AR-N 7520.18 ; 7520.073	e-beam resists		-	4 : 1	
AR-N 7700.18 ; 7700.08	e-beam resists	-	undil. ; 4 : 1	- ; undil.	-
AR-N 7720.30 ; 7720.13	e-beam resists	-	-	undil. ; 4 : 1	-

Information on developer processing (→ see also information on developers AR 300-26 and 300-35)

If metal ion-free developers are diluted, it is recommended to adjust the desired normality immediately prior to use by very careful dilution (with scales) of the stronger developer with DI water. Even small differences in normality may cause larger differences in the development rate. Developers should be used as fast as possible, since otherwise developer efficacy may be reduced.

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Developer for AR E-Beam Resists

AR 600-50, 600-546, -548, -549, 600-55, -56 developer

For the development of e-beam resists films

Characterisation

- ultrapure, ultra-filtered (0.2 µm) solvent mixtures
- storage temperature at 10-22 °C

Properties

(safer solvent / optimally suited / suited)

AR resist / developer	AR 600-50	AR 600-55	AR 600-56
Fields of application/conditions	dip, puddle, spray development at 21-23 °C ± 1 °C		
Main component(s)	methoxypropanol / isopropyl alcohol	methyl isobutyl ketone (MIBK)	methyl isobutyl ketone (MIBK)
Properties		strong developer	weaker developer
Density at 20 °C (g/cm3)	0.871	0.792	0.788
Refractive index at 20 °C	1.395	1.384	1.381
Water content max. (%)	0.1	0.1	0.1
Flash point (°C)	21	12	12
AR-P 617	2-3 min	3 min	3 min
AR-P 630 - 670 series	-	1-3 min	1-3 min
AR-P 6500	-	-	-

AR resist / developer	AR 600-546	AR 600-548	AR 600-549
Fields of application/conditions	dip, puddle, spray development at 21-23 °C ± 1 °C		
Main component(s)	amyl acetate	diethyl ketone / diethyl malonate	diethyl malonate / anisole
Properties	weaker developer	strong developer	moderate developer
Density at 20 °C (g/cm3)	0.876	0.917	1.053
Refractive index at 20 °C	1.402	1.401	1.417
Water content max. (%)	0.1	0.1	0.1
Flash point (°C)	41	22	85
AR-P 6200	1 min	1 min	1 min

Information on developer processing

The choice of the developer strongly influences the development rate, the sensitivity and the profile of the resist structures. Coated and exposed substrates are treated with developers which are suitable for the respective process (puddle, spray, immersion bath) at a temperature of 21-23 °C kept as constant as possible. The required development time depends in each case on the resist film thickness. Films with a thickness of less than 0.2 µm can for example be completely developed after 30 s. The development process can be slowed down for AR 600-50, -55 and -56 by adding 10-20 % of the stopper AR 600-60.

Weaker developers like AR 600-56 and AR 600-546 provide a higher resolution without dark erosion, while a significantly higher sensitivity with at the same time higher dark erosion can be obtained with developers AR 600-55 and AR 600-548. If CSAR 62 is processed with developer AR 600-548 at a development temperature of about 0 °C, even after 10 minutes no erosion is observed at the prolonged development time. Substrates have to be rinsed immediately after development for 30 seconds with stopper and are subsequently dried.

Stopper for AR Resists

AR 600-60 stopper

For the stopping of e-beam resist film development with solvents

Characterisation

- immediate interruption of the development process
- ultrapure solvent mixtures for residue-free removal of remaining developer
- AR 600-60 for AR-P 617, 630-670 er, 6200
- AR 600-61 for AR-P 6510

Properties I

Parameter / AR	600-60
Density at 20 °C (g/cm^3)	0.785
Water content max. (%)	0.1
Non-volatiles max. (%)	0.002
Flash point (°C)	12
Filtration (µm)	0.2
Storage temperature (°C)	10-22

Information on remover processing

The addition of stopper for approximately 30 s after development interrupts the development process and leads to a rapid rinsing of residual developer.

Due the processing regime however, constantly developer is transferred into the stopper bath. Already small amounts of the developer will affect the efficiency of the stopping process. It is thus highly recommended to constantly exchange the stopper or to use two stopper baths which are arranged consecutively.

If 10-20 % of stopper AR 600-60 is added to developers AR 600-50, 600-55 and 600-56, the development process is slowed down.

If the stopper AR 600-60 is used for developers AR-P 630-670, higher contrast values up to 10 are possible, while the sensitivity of the PMMA resists is at the same time decreased. Higher exposure doses and prolonged development times are thus required in this case.

Remover for AR Resists

AR-P 600-71, 300-76, 300-70, 300-72, 300-73 remover

For the stripping of tempered photoresist and e-beam resist films

Characterisation

- aqueous-alkaline solution (AR 300-73) or organic solvents (all others)

Remover recommendations after tempering:

- photoresists up to 180 °C: AR 600-71, 300-76
- photoresists up to 200 °C: AR 300-76, 300-71
- PMMAs up to 200 °C: AR 600-71, 300-76
- copolymers up to 210 °C: AR 600-71, 300-76
- CSAR 62 up to 200 °C: AR 600-71, 300-76
- novolac e-beam resists 150 °C: AR 300-73, 300-76

Properties

Parameter / AR	600-71	300-76 new	300-70, -72	300-73
Main component	dioxolane	DMG	NEP	TMAH
Density at 20 °C (g/cm3)	1.02	1.08	1.03	1.00
Non-volatiles max. (%)	0,002			
Flash point (°C)	3	103	98	-
Filtration (µm)	0,2			
Storage temperature (°C)	10-18	10-22	10-22	10-22

Remover recommendations

optimally suitable | suitable | limited suitability | unsuitable

Properties / Remover AR average time for removal at 1.5 µm	600-71	300-76 new * heated to 80 °C		300-70, 300-72 * heated to 80 °C		300-73 + heated to 50 °C	
Suitability for tempered photoresist films (21 °C)	efficient all-rounder	universal, replacing the reprod. toxic, NEP: = AR 300-70, -72		universal, especially for thin films, but toxic for reproduction		special: AR-BR 5400, AR-P 3100, 3500, 3700	
120 °C	10 s	25 s		20 s		30 s	
150 °C	15 s	3 min	25 s *	2 min	20 s *	2 min	60 s +
180 °C	4 min	2 h	60 s *	2 h	50 s *	2 h	2 min +
200 °C			30 min *		25 min *		30 min +
Suitability for tempered e-beam resist films (21 °C)	efficient all-rounder	universal, replacing reprod. -toxic NEP:		universal, but toxic for reproduction		special: AR-N 7520, 7700	
PMMA 150 °C	20 s	20 min	10 s *	18 min	10 s *	15 min +	
PMMA 180 °C	2 min	30 min	30 s *	28 min	30 s *	25 min +	
PMMA 200 °C	3 min	42 min	50 s *	40 min	50 s *		
Copolymer 190 - 210 °C	5 s		60 s *		50 s *	20 min +	
CSAR 62 150 °C	30 s		60 s *		50 s *	10 min +	
CSAR 62 180 - 200 °C	40 - 60 s		5 min *		4 min *	15 - 25 min +	
Novolac-based 85 - 120 °C	3 - 50 s except 7700	5 s * except 7520, 7700		5 s * except 7520, 7700		25 s - 3 min +	
Novolac-based 150 °C	5 s - 7 min except 7520, 7700	30 s * except 7520, 7700		10 s * except 7520, 7700		10 s - 50 min +	

Processing instructions for removers

Substrates coated with resist are exposed to the effect of the remover by immersion (puddle or dip). To reduce the dissolution time for tempered layers, removers AR 300-70, 300-72 and 300-76 may be heated to up to 80 °C, remover AR 300-73 to up to 50 °C or megasound may be helpful in this case. It is recommended to rinse off the remover with DI water, clean remover or with a suitable thinner. A stripping of very hard-baked layers (> 220 °C) with remover is hardly possible any more. In this case, oxidizing acids or oxygen plasma may be used for stripping. Further detailed remover specifications for a large variety of resists are listed on the following pages.

Remover for AR Resists

Remover recommendations

< 20/60 s optimally suitable | < 5/30 min suitable | < 1-6 h limited suitability | ≥ 6 h unsuitable

Product AR	Film thick-ness (µm)	Tempe-ring (°C)	Recom-mend.	600-71	300-76		300-70, 300-72		300-73	
				21 °C	21 °C	80 °C	21 °C	80 °C	21 °C	50 °C
AR-P 3100 Example 3110	1.5	95 - 120	300-76 300-73	< 20 s	< 20 s		< 20 s		< 20 s	
		150		3 h	< 20 s		< 20 s		< 60 s	
		180		6 h	< 5 min	< 60 s	< 5 min	< 60 s	1 h	< 60 s
		200				< 30 min		< 30 min		< 30 min
AR-P 3200 Example 3220 AR-P 1200	10	95	300-76 600-71	< 20 s	< 20 s		< 20 s		< 5 min	< 60 s
		120		< 20 s	< 60 s		< 60 s		< 30 min	< 5 min
		150		< 20 s	< 5 min	< 60 s	< 5 min	< 60 s	< 30 min	< 5 min
		180		4 h	1 h	< 30 min	1 h	< 30 min		< 30 min
		200				1 h		1 h		2 h
AR-P 3500 Example 3540	1.5	95 - 150	300-76 600-71	< 20 s	< 20 s		< 20 s		< 20 s	
		180		< 5 min	< 5 min	< 20 s	< 5 min	< 20 s	< 60 s	< 20 s
		200				< 1 h		< 1 h	3 h	< 30 min
AR-P 3500 T Example 3540 T	1.5	95 - 120	300-76 600-71	< 20 s	< 20 s		< 20 s		< 20 s	
		150		< 5 min	< 60 s	< 20 s	< 5 min	< 20 s	< 30 min	< 5 min
		180			< 30 min	< 5 min		< 5 min		< 30 min
		200				1 h		1 h		
AR-P 3700 / 3800 Example 3740	1.5	95	300-76 600-71	< 20 s	< 20 s		< 20 s		< 60 s	
		120		< 20 s	< 20 s		< 20 s		< 5 min	< 20 s
		150		< 20 s	< 60 s		< 60 s		< 5 min	< 20 s
		180		< 30 min	< 5 min	< 60 s	< 5 min	< 60 s	< 30 min	< 60 s
		200				< 30 min		< 30 min	6 h	< 30 min
AR-P 5300 Example 5350	1.5	95 - 150	300-76 600-71	< 20 s	< 20 s		< 20 s		< 20 s	
		180		< 60 s	< 60 s		< 60 s		< 60 s	
		200				1 h		1 h		< 30 min
AR-PC 500(0) Example 504	2.0	150	300-76 600-71	< 5 min	< 1 h	< 5 min	< 1 h	< 5 min		< 5 min
		190		< 30 min	1 h	< 5 min	1 h	< 5 min		4 h

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Remover for AR Resists

Remover recommendations

< 20/60 s optimally suitable | < 5/30 min suitable | < 1-6 h limited suitability | ≥ 6 h unsuitable

Product AR	Film thick-ness (µm)	Tempe-ring (°C)	Recom-mend.	600-71	300-76		300-70, 300-72		300-73	
				21 °C	21 °C	80 °C	21 °C	80 °C	21 °C	50 °C
AR-N 4300 Example 4340	1.5	95	300-76 (300-72)	< 20 s	< 20 s		< 20 s		< 60 s	
		110			< 60 s		< 60 s		1 h	< 60 s
		120			< 30 min	< 5 min	< 5 min		6 h	< 30 min
		150			1 h	< 30 min	< 30 min	< 5 min		< 30 min
		180			6 h	1 h	1 h	< 30 min		
		200					5 h	1 h		
AR-N 4400 Example 4400-50	50	95	600-71 600-70	< 20 s	< 5 min	< 5 min	< 5 min	< 60 s	< 60 s	
		120		< 5 min	6 h	< 60 s	5 h	< 60 s	6 h	< 30 min
		150		< 5 min		1 h		1 h		2 h
		180		< 30 min		2 h		2 h		
		200		4 h						
AR-P 617 Example 617.08	0.5	190	600-71 300-76	< 5 min	< 1 h	< 60 s	< 1 h	< 60 s		< 30 min
		210		< 5 min	6 h	< 5 min	6 h	< 5 min		< 30 min
AR-P 630-670 Example 671.05	0.5	150	600-71 300-76	< 20 s	< 30 min	< 20 s	< 30 min	< 20 s		< 30 min
		180		< 5 min	< 30 min	< 60 s	< 30 min	< 60 s		< 30 min
		200		< 5 min	< 1 h	< 60 s	< 1 h	< 60 s		
AR-P 6200 new Example 6200.09	0.4	150	600-71 300-76 300-73	< 20 s	< 30 min	< 5 min	< 30 min	< 5 min	< 30 min	< 5 min
		180		< 60 s	< 30 min	< 5 min	< 30 min	< 5 min	< 1 h	< 30 min
		200		< 60 s	< 30 min	< 60 s	< 30 min	< 60 s		< 30 min
AR-N 7500 Example 7500.18	0.4	85-150	300-76 300-73	< 20 s	< 20 s		< 20 s		< 20 s	
		180				6 h		4 h	3 h	< 10 min
AR-N 7520 new Example 7520.17	0.4	85	300-73 300-76	< 20 s	< 20 s		< 20 s	< 20 s	< 60 s	
		105		< 20 s	< 20 s		< 20 s	< 20 s	< 5 min	
		120				4 h		3 h	< 30 min	< 5 min
		150				6 h		4 h		< 1 h
AR-N 7700 Example 7700.18	0.4	105	300-73 300-76		< 1 h	< 30 s		< 1 h	< 1 h	< 60 s
		120							< 1 h	< 5 min
		150							3 h	< 30 min
AR-N 7720 Example 7720.18	1.4	105-120	300-76 (300-72)	< 60 s	< 20 s		< 20 s		< 20 s	
		150		< 5 min	3 h	< 5 min	1 h	< 5 min	< 90 s	
		180				< 30 min	< 30 min	< 30 min	< 60 min	< 5 min
		200				1 h		1 h		

The average times required for removal as listed under "properties" are divided into time clusters (< 20 s, < 60 s …) for better orientation. Remover recommendations generally apply to the commonly used tempering at 150 °C and 180 °C.The recommendation for remover AR 300-72 is indicated in brackets, since this remover is highly effective, but also classified as toxic for reproduction and thus not prioritized by Allresist. As replacement, we recommend the equivalent removers AR 300-76 and 600-71.

Adhesion Promoter for AR Resists

AR 300-80 new and HMDS adhesion promoter

For improving the adhesive strength of photo and e-beam resists

Characterisation

- improvement of the adhesive strength of photo and e-beam resist films
- especially for surfaces with low adhesion properties, e.g. metal, SiO_2, GaAs
- AR 300-80 new: spin coating of a silicium organic solution = improved adhesion properties and simple, cheaper alternative to HDMS
- HMDS: evaporation of HMDS on the substrate surface (equipment required)

Properties

Parameter / AR	300-80 new	HMDS
Density at 20 °C (g/cm³)	0.971	0.774
Flash point (°C)	7	14
Filtration (µm)	0.2	0.2
Storage temperature (°C)	10-22	

Processing information AR 300-80 (new)

AR 300-80 new is applied by spin coating between 1000 and 6000 rpm. The film thickness can be adjusted by varying the spin speed to the optimum conditions of the respective process.

Higher spin speeds and thus thinner films are preferable, e.g. 4000 rpm with approx. 15 nm thickness. Too high concentrations (film thickness values) may reduce or neutralise the adhesion-promoting effect.

It is recommended for AR 300-80 new to perform the subsequent tempering on a hot plate for 2 min or in a convection oven for 25 min at 180 °C. AR 300-80 new offers the big advantage for sensitive substrates that a bake step at olny 60 °C for the same amount of time is sufficient, even though higher temperatures are well tolerated. The previous AR 300-80 product will only be sold as long as it is in stock.
During tempering, a very uniform, extremely thin layer of adhesion promoter is generated on the substrate (approx. 15 nm). After cooling of the substrate, the resist can be applied as usual.

An excess of adhesion promoter may be rinsed off with organic solvents like e.g. AR 600-70 or AR 600-71. The optimised surface properties are maintained without restriction.

Processing information HMDS

Appropriate equipment is required for the processing of HMDS. For large scale production, hot plates with HMDS vapor deposition are used. If no such equipment is available, the following procedure should be applied:

The pre-treatment should be performed immediately prior to resist coating. Generally, hot plates with integrated HMDS-evaporation are used in the production. If this option is not available, the substrate is placed in a desiccator where HMDS evaporates at room temperature or at temperatures up to 160 °C max. HMDS is under these conditions deposited as monomolecular layer (approx. 5 nm) on the substrate surface.

The treated substrate can be coated with resist immediately after HMDS-deposition without subsequent tempering, or stored in a closed container for a couple of days.

The storage stability may be limited due to an uptake of water from the atmosphere. Storage in open containers should thus be avoided.

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