Technical datasheet

AZ® Remover 910

APPLICATIONS

Resist removal

- Designed to strip and dissolve negative-tone chemically amplified crosslinked resists
- Very effective at removing and dissolving positive-tone photoresists such as DNQ/Novolac and chemically amplified

Type of Resist	Cleaning Performance	
	Resist Strip	Resist Dissolution
Positive-Tone DNQ/Novolac (AZ P4620)	Yes	Yes
Positive-Tone Chemically Amplified (AZ 3DT-315)	Yes	Yes
Negative-Tone Chemically Amplified (AZ 15 nXT, AZ nLOF)	Yes	Yes

- Suitable for processes where sensitive metals and other materials are exposed; low etch rates on:
  - Al, Cu, Ti, W, TiW, TiN, Sn, Ni
  - Si, SiO2

GENERAL PROPERTIES

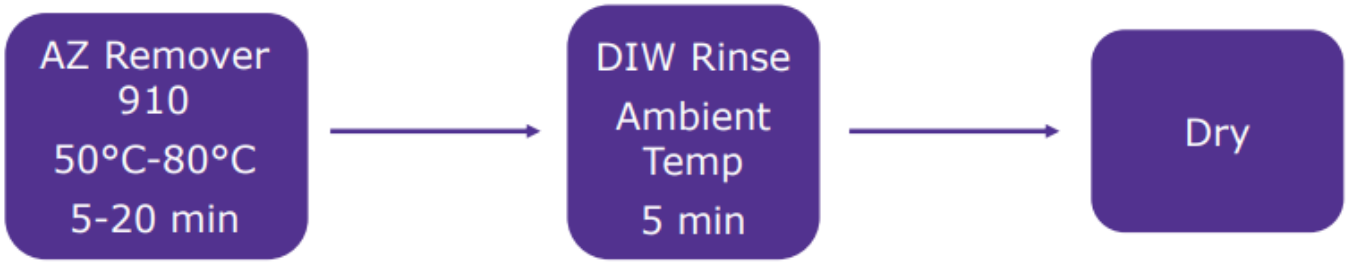
Chemistry

- Solvent based product, contains acids
- EH&S friendly: acceptable in Europe
  - DPGME based
  - No NMP, DMAC, DMSO, TMAH
  - Amine free
- Acidic pH
- General composition
  - Organic solvents: penetrate, swell, and dissolve organic resist/residues
  - Acids: aid in breaking down the resist and dissolving it.

GENERAL PROPERTIES

Process Conditions

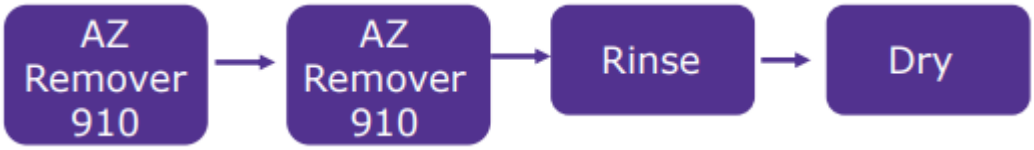
- Typical process flow



- AZ Remover 910 is water miscible: can directly go to a DIW rinse
- IPA is not recommended as an intermediate rinse
    - If IPA is used as a rinse it must be followed by DIW

Process Tools

- Suitable for use in batch immersion tools (wet benches)
    - Recommended process flow is to use a 2 tank set-up:



    - Split the total strip time between the two AZ Remover 910 tanks
    - 2 tank system minimizes resist re-deposition on the wafers: majority of resist comes off in first tank; 2nd tank removes remaining resist and prevents resist from re-depositing
    - It is recommended that the AZ Remover 910 tanks be recirculated and filtered
    - Any possible agitation beyond the normal recirculation of the fluid is recommended
- Suitable for use in batch spray tools as well
- Suitable for use in Veeco tools (immersion/high pressure spray combination)

Process Tools: Compatibility for Materials of Construction

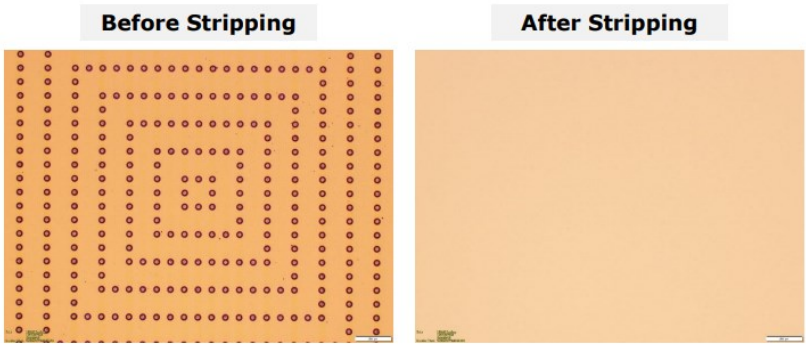
- Compatible materials
    - PTFE
    - 316L EP stainless steel
    - Quartz
- Incompatible materials
    - Viton

PERFORMANCE DATA

			Process Conditions			Temp. 60°C for 5 min	
Stripper	**Positive Resist Platform**	**Resists**	**Substrate**	**HB**	**FT (µm)**	**Resist Removed**	**Resist Dissolved**
AZ® Remover 910	Positive Chem Amplified	AZ® 3DT-315	Si	None	12.6	YES	YES
	Positive Novolak	AZ® P4620	Si	None	12.4	YES	YES
			Process Conditions			**Temp. 60°C for 5 min**	
	Negative Resist Platform	**Resists**	**Substrate**	**HB**	**FT (µm)**	**Resist Removed**	**Resist Dissolved**
	Negative Cross Linked	AZ®15nXT	Cu	None	11.0	YES	YES
	Negative Cross Linked	AZ nLOf 2070	Si	None	7.8	YES	YES

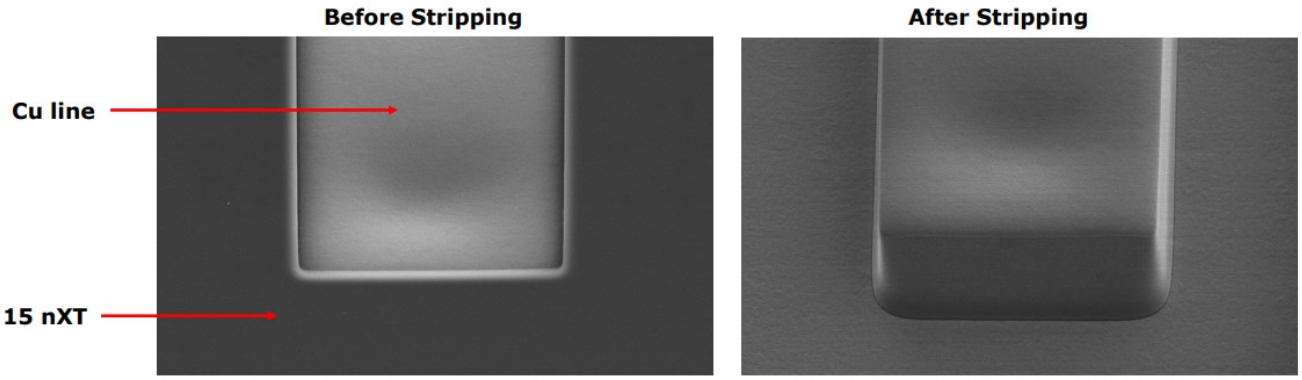
Stripping Results with AZ® Remover 910, 60°C, 5 minutes AZ® 15 nXT Resist on Cu wafer

Substrate : 8 inch Cu wafers
Resist : AZ® 15 nXT
Film Thickness : 11 µm
Exposure : Suss Aligner @ 900 mJ/cm²
Soft Bake : 110°C/180 sec
PEB : 120°C/60 sec
Development : 2 x 60 sec in AZ® 300 MIF
Hard bake: : None



- AZ® Remover 910 removed and dissolved AZ® 15 nXT from Cu wafer at 60°C within 5 min - → Resist pieces dissolved in solution

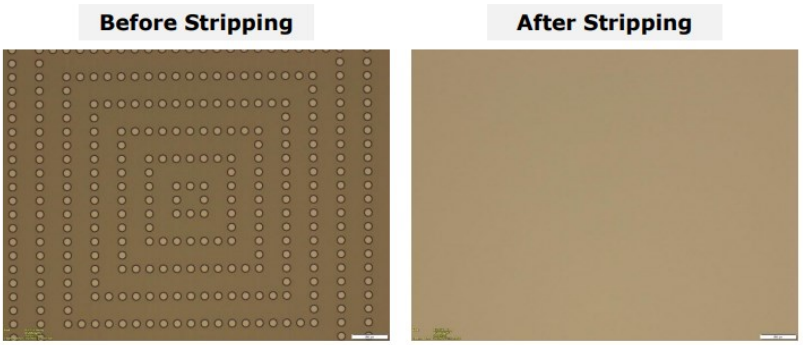
Stripping Results with AZ® Remover 910, 65°C, 10 min AZ® 15 nXT Resist on Electroplated Cu wafer



- AZ Remover 910 removed and dissolved the 15nXT without etching the exposed Cu line

Stripping Results with AZ® Remover 910, 60°C, 5 minutes AZ® nLOF 2070 Resist on Si wafer

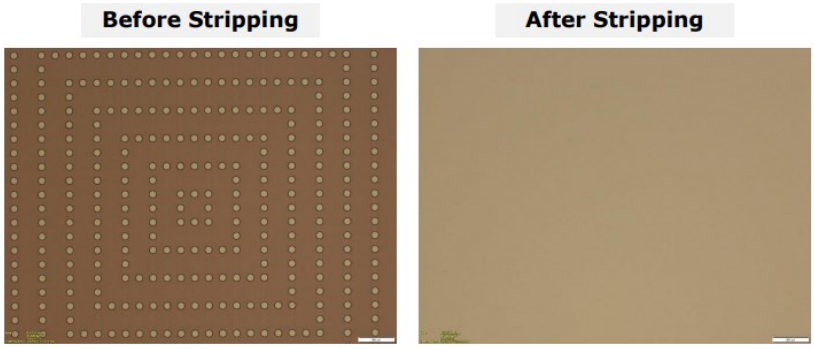
Substrate	: 8 inch Si wafers
Resist	: AZ® nLOF 2070
Film Thickness	: 7.8 µm
Exposure	: Suss Aligner @ 200 mJ/cm²
Soft Bake	: 110°C/90 sec
PEB	: 110°C/90 sec
Development	: 1 x 90 sec in AZ® 300 MIF
Hard bake:	: None



- AZ® Remover 910 removed and dissolved AZ® nLOF 2070 from Si wafer at 60°C within 5 min → Resist pieces dissolved in solution

Stripping Results with AZ® Remover 910, 60°C, 5 minutes AZ® P4620 Resist on Si wafer

Substrate	: 8 inch Si wafers
Resist	: AZ® P4620
Film Thickness	: 12.4 µm
Exposure	: Suss Aligner @ 600 mJ/cm²
Soft Bake	: 110°C/240 sec
Development	: 4 x 60 sec in AZ® 300 MIF
Hard bake:	: None

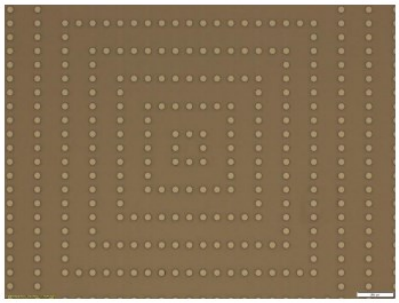


- AZ® Remover 910 removed and dissolved AZ® P4620 from Si wafer at 60°C within 5 min → Resist pieces dissolved in solution

Stripping Results with AZ® Remover 910, 60°C, 5 minutes AZ® 3DT-315 Resist on Si wafer

Substrate	: 8 inch Si wafers
Resist	: AZ® 3DT-315
Film Thickness	: 12.6 µm
Exposure	: Suss Aligner @ 400 mJ/cm²
Soft Bake	: 110°C/300 sec
PEB	: 110°C/60 sec
Development	: 2 x 60 sec in AZ® 300 MIF
Hard bake:	: None

Before Stripping



After Stripping

- AZ® Remover 910 removed and dissolved AZ® 3DT-315 from Si wafer at 60°C within 5 min
  → Resist pieces dissolved in solution

Etch Rates
- Low etch rates on many common metals and materials

Etch Rates of AZ Remover 910 at 80°C (Å/min)

Al	Cu	Ti	W	TiW	TiN	Sn	Ni	GaAs
< 1	< 1	<1	1	< 1	5	< 1	< 1	45*

* Remover 910 GaAs etch rate quickly decreases as the remover heats. After 2 hours of heating at 60°C, the GaAs etch rate at 60°C dropped to < 1 Å/min

- Etch rates determined by using a Jandel 4 point probe to measure the metal film thickness

Bath Life
- Is usually limited by resist loading/saturation effects
  - At some point it will not be able to dissolve any more resist
- Saturation effects will be dependent on many factors
  - Type of resist
  - Resist thickness
  - Resist processing parameters (bakes, exposures, plasma etches, etc)
  - # of wafers processed
  - % coverage of resist on the wafers
  - Temperature of the AZ Remover 910
- Bath life is best determined by performing the test at the customer site
  - Most accurate results since the customer's materials, equipment, and processes are used

AZ® Remover 910 Bath Life Data

Wafer processing conditions

Resist:	AZ® P4620
Resist platform:	Positive-tone, DNQ/Novolak
Film thickness:	12.6 µm
Soft bake:	110°C x 240 sec
Pattern:	None, 100% coverage
Edge exclusion:	none
Exposure dose:	unexposed
Substrate:	8" HMDS-primed Silicon

Remover bath conditions

Temperature:	80°C
Volume:	150 mL in 250mL beaker
Agitation:	300 RPM stirring

Able to clean 10 full wafers by dissolution of resist in 150mL of AZ® Remover 910. This is equivalent to **>250 8" wafers fully covered with resist per gallon of AZ® Remover 910**.

AZ® Remover 910 Bath Life Data

Wafer processing conditions

Resist:	AZ® 15nXT
Resist platform:	Negative-tone CA
Film thickness:	11.2 µm
Soft bake:	110°C x 180 sec
Pattern:	Contact holes, 72% coverage
Exposure dose:	900 mJ/cm^2
PEB:	120°C x 60 sec
Substrate:	8" HMDS-primed Silicon

Remover bath conditions

Temperature:	80°C
Volume:	150 mL in 250mL beaker
Agitation:	300 RPM stirring

Able to clean 11 wafers with 72% resist coverage by dissolution of resist in 150mL of Remover 910. This is equivalent to **>250 8" wafers with 81% resist coverage per gallon of Remover 910**.

SUMMARY

- Very effective at removing and dissolving negative-tone chemically amplified crosslinked resists
- Very effective at removing and dissolving positive-tone resists such as DNQ/Novolac and chemically amplified
- Low etch rates on many sensitive metals and other materials
- EH&S friendly product: Acceptable in Europe
    - No NMP, DMAC, DMSO, TMAH
- No intermediate rinse necessary: go directly to DIW rinse
- Suitable for use in batch immersion, batch spray, and Veeco tools

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