EMD PERFORMANCE MATERIALS

technical datasheet

AZ® 300T/400T Removers

General Purpose Photoresist Strippers

APPLICATION

AZ 300T and AZ 400T are high purity, high performance, NMP based photoresist removers designed for rapid dissolution of post etch or post implant photoresist patterns. Alkaline additives make these removers extremely effective for complete removal of organic residues and corrosion inhibitors provide compatibility with most metals. AZ 300T and 400T can achieve complete dissolution of standard DNQ, Chemically Amplified, and negative tone cross linking type photoresists.

- Removes post etch organic residues
- Getters surface metal ion contaminants
- Water or IPA/Water rinse
- Long bath life
- High purity, low particulate formulations (0.20µm filtered)

TYPICAL PROCESS

Bath immersion* @ 70-85C
Process time: 5-20 min**
Double bath recommended
Agitation: recommended
Rinse: DIW or IPA/DIW

* AZ 300T and 400T may be processed in spray equipment. Consult with the equipment manufacturer for process recommendations.

** Process time and temperature are dependent upon resist processing conditions.

MATERIALS COMPATIBILITY

AZ 300T and 400T should be processed only in equipment with PTFE, quartz, or SS wetted surfaces.

Recommended personal protective gear during handling includes face shield/goggles, apron, and solvent resistant butyl rubber gloves. Gloves made from latex or vinyl are not recommended.

300T/400T removers are not recommended for use with the following materials: Polyvinyl Chloride (PVC), Polyvinylidene Fluoride (PVDF), Polyester Ether, Hypalon®, Styrenes, Polyethylene Terephthalate, Viton®, Natural Rubber, Neoprene, Polyurethane, Polycarbonate, or Acrylic.

Avoid contact with strong acids, alkaline materials, and oxidizing agents.

STORAGE

AZ 300T/400T should be stored in a well ventilated, cool, dry environment away from light and incompatibles. Do not expose to excessive temperatures or moisture. Recommended storage temperature is >0C.

DISPOSAL

AZ 300T and 400T are compatible with typical facility solvent drain lines and materials. For disposal other than via facility solvent drains, refer to the product MSDS and to local regulations.

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PROCESS CONSIDERATIONS

BATH LIFE

AZ 300T/400T bath life will vary with process and environmental conditions. Strip rates will decrease as heated baths become loaded with dissolved organic material. Bath loadings are dependent upon wafer size, number of wafers processed, photoresist thickness, and the percent of substrate area covered with photoresist. Baths should be changed immediately if a decrease in strip rate is observed.

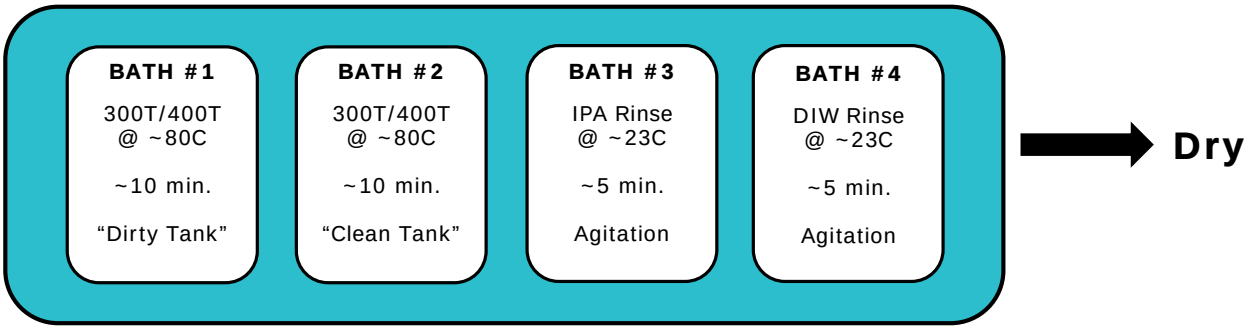
Due to possible evaporation and moisture uptake, stripper bath lives should also be limited by elapsed time. It is recommended that open, heated stripper baths be changed at least once every 24 hours.

PROCESSING EQUIPMENT

AZ 300T and 400T should be processed under a fume hood to avoid inhalation of solvent vapors. Refer to the product Material Safety Data Sheet for additional precautionary and safety information.

RECOMMENDED PROCESS FLOW

For best results in high volume production environments the following equipment configuration and process flow are recommended. Note that AZ 300T and 400T will lift the photoresist from the substrate surface BEFORE the resin matrix is fully dissolved. Using a double bath configuration is advantageous since as the first bath will exhibit a spike in particle counts until the lifted resist can be dissolved.



Wet Bench with Hood and Exhaust

REMOVAL RATES

Removal rate testing for thick films (12-15µm) of AZ 12XT (CA) and AZ P4620 (DNQ/novolac) photoresists indicate complete removal and dissolution in less than 5 minutes when processed in a 300T/400T bath heated to 80°C. Actual removal rates may vary depending upon the thermal and processing history of the photoresist film.

BATH AGITATION

For best removal results, mechanical agitation of the stripper bath during processing is recommended. AZ 300T and 400T are low foaming formulations that may be used with either manual or ultra-sonic bath agitation. Nitrogen bubblers may be used to provide agitation during IPA and DIW rinses.

RINSING

Although 300T and 400T are water rinsable, a pre-rinse in alcohol (IPA recommended) may improve rinse times, yield a cleaner final surface, and decrease risk of metals corrosion. As with any solvent based remover, care should be taken to avoid cross contamination of the stripper bath with water or other rinse agents.

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PROCESS CONSIDERATIONS

CHEMICAL USAGE and PARTICLES

Chemical usage and particles may be reduced by transferring the stripper from bath #2 (clean bath) to bath #1 and replenishing bath #2 with fresh chemical after every 100 wafers (or 50% through the pre-determined bath life). Stripper baths may also be recirculated through a filter to reduce particles and extend bath life. Filters should be constructed of 100% PTFE only.

SUBSTRATE COMPATIBILITY

AZ 300T and 400T are compatible with most common semiconductor substrates including SiO_2, SiN, Si and polysilicon, SiON, BPSG, TiW, TiN, NiCr, SiC, Au, Al*, Cu, and Mb.

* The alkaline rinse component in both 300T and 400T will exhibit a very slow etch rate on Al (<10Å / min). This effect yields exceptionally clean Al surfaces but may be undesirable for very thin Al layers or environments where precise Al thickness control is critical.

CAUTION: NMP based removers will become extremely corrosive to aluminum and other metals if the heated tanks are contaminated with even trace amounts of water. Extreme care must be taken to ensure remover tanks remain isolated from water sources at all times.

PRODUCT SELECTION CRITERIA

AZ 300T and AZ 400T formulations are optimized for different process environments and the following factors should be considered before choosing the best remover.

AZ 400T: Bulk photoresist removal rates tend to be slightly higher with the AZ 400T vs. AZ 300T. Processes involving thick and/or heavily cross-linked photoresists may benefit from the faster strip rate associated with AZ 400T. Likewise, high dose implanted and high temperature plasma etched resists will typically lift and dissolve more readily in 400T vs. 300T.

AZ 300T: The alkaline rinse agent in AZ 300T assists in the removal of sidewall polymer residue commonly seen after aluminum and aluminum alloy substrates are etched in plasma. Dry etched Al and any processes involving chemical (wet) etching of the substrate are best suited to the AZ 300T Remover.

Contact holes dry etched in dielectric layers and terminating on metallic substrates may also exhibit sidewall polymers incorporated with metallic material from back-sputter. In many cases, AZ 300T is more effective in breaking down and removing these residues.

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PRODUCT SPECIFICATIONS

Solvent GC (300T and 400T)	%
Chlorides (ppm)	5.0 max
Water (%)	0.75 max

Normality	N
AZ 300T	0.370 ± 0.005
AZ 400T	0.175 ± 0.005

Trace Metals (300T and 400T)	ppb
Al	100 max
Ca	100 max
Cu	100 max
Fe	100 max
K	100 max
Mn	100 max
Na	200 max
Ni	100 max
Pb	100 max
Zn	100 max

Filtration	µm
AZ 300T	0.20
AZ 400T	0.20

Specifications are subject to revision. Contact your AZ products representative for additional information.

North America:
EMD Performance Materials
70 Meister Avenue
Somerville, NJ USA 08876
(908) 429-3500

Germany:
Merck Performance Materials
(Germany) GmbH
Wiesbaden, Germany
+49 611 962 4031

Korea:
Merck Performance Materials
(Korea) Ltd.
Seoul, Korea
+82 2 2056 1316

Singapore:
Merck Performance Materials
Pte. Ltd.
Jurong East, Singapore
+65 68900629

Taiwan:
Merck Performance Materials
Co. Ltd.
Hsinchu, Taiwan
+886 3 5970885#375

Japan:
Merck Performance Materials
G. K.
Tokyo, Japan
+81 3 5453 5062

China:
Merck Electronic Materials
Shanghai, China
+86 (21) 2083 2362

www.emd-performance-materials.com