

Antitarnish-A-100



Passivation of Precious Metal Surfaces
by Immersion Process

Antitarnish-A-100 is based on an aqueous, metal-free solution in which an organic inhibitor is present as a fine dispersion. The passivation layer is normally applied by immersion and is designed for precious metal surfaces, especially silver, precious metal alloys and copper. A thin transparent layer protects the metal from tarnishing generally caused by hydrogen sulfide.

The layer will neither affect the solderability nor the bondability compared to an untreated metal surface. The conductivity and contact resistance will not be affected. Color and brightness of the metal surfaces will also not be influenced.

The protective layer also acts as a lubricant due to its chemical composition. Antitarnish-A-100 does not contain any components that are harmful to the environment - no chlorofluorohydrocarbons, chlorinated hydrocarbons, aromatic hydrocarbons or chromium compounds in particular.

Properties

Bath:	Aqueous, metal-free immersion process*
Color:	Uninfluenced
Brightness:	Uninfluenced
Friction coefficient:	Hardly reduced
Sliding properties:	Improved
Solderability:	Uninfluenced
Bondability:	Uninfluenced
Contact resistance:	Uninfluenced

*For electrophoretic coating process see product information Antitarnish-A-100 PRO-KIT.

Form of Supply

Antitarnish-A-100

is delivered in following package sizes:
100ml / 1L / 5L / 10L

Antitarnish-A-100 (ready-to-use)

is delivered in following package sizes:
1L / 5L

The concentrate must be stored in a frost-protected area and should not be stored at temperatures above 35°C. If Antitarnish-A-100 is stored at temperatures above 35°C, the color may change to a clear solution. When cooled down the solution will return to its white color. If this occurs, Antitarnish-A-100 must be mixed well by shaking the bottle. Storage stability of 24 months refers to the status in the closed original package.

Necessary Equipment

Bath tank: Preferably polypropylene tank provided with a built-in overflow. The overflow is important to ensure that no foam will float on the bath surface. Otherwise there will be stains on the surface of the parts when taking out of the bath.

Heating system: Temperature adjustable heaters (coated with quartz, Teflon or porcelain). Ensure sufficient recirculation and avoid local overheating of the bath.

Agitation equipment: Parts and/or bath should be sufficiently agitated in order to reach a uniform passivation. Bath agitation can be achieved with an immersion pump.

Exhaust system: Recommended as concentrate and makeup-solution have a particular smell.

Bath Make-up for 1 Liter Bath

Make-up: Fill 960ml of DI-water into a clean bath tank. Heat to an operating temperature of 40°C. For the next step warm up Antitarnish-A-100 to 40°C, shake thoroughly and add the desired amount of the concentrate (normally 10-20ml/L; possible range: 5-50ml/L). Always pour the product, do not use pipettes, even for small amounts. Fill up with DI-water to a volume of 1 liter and mix thoroughly: the solution is now ready to use.

Replenishment: Continuous replenishment of Antitarnish-A-100 is recommended according to throughput. 1 liter Antitarnish-A-100 is approximately required to apply a passivation layer on 2000 sqm of metal surface.

Operating Conditions

Concentration:

10-20ml/L Antitarnish-A-100
(possible range: 5-50ml/L).

Operating temperature:

40°C - 50°C.
Operating temperature must not exceed 60°C as bath components will otherwise be destroyed. The temperature is too high if the solution becomes cloudy and opaque – this will occur at temperatures above 52°C.

pH-value: No control required. Weakly alkaline.

Agitation: Slow agitation by means of a pump and/or agitation of the parts is recommended.

Filtration: Not recommended as active compound might be absorbed by the filter.

Time of exposure:

Rack/Barrel: 300 seconds (range: 120-300 seconds);
Reel-to-reel: 10 seconds (range: 5-20 seconds).

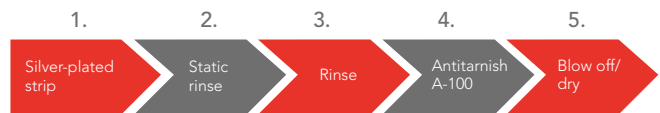
Process Sequence

The process sequence depends on the surface quality of the parts to be passivated. Used surfaces must be cleaned, degreased and finally activated with an acid dip before starting the passivation process. The recommended process sequence is as follows:

Rack / Barrel:



Reel-to-reel:



In general the parts are taken out of an electroplating bath, rinsed with water and passivated with the Antitarnish-A-100. After passivation parts require a two-step rinse to maintain a shiny surface. The first rinse should be a static rinse with hot water (50-60°C). The second rinse is a flow rinse with DI-water. Afterwards the parts can be dried.

The static rinse can be improved by addition of 1% Antitarnish-A-POST-DIP to avoid stains of Antitarnish-A-100 particles (foam etc.). In this case a water temperature of 40-50°C is sufficient. This rinse solution can also be used to compensate evaporation losses of the Antitarnish-A-100 solution.

Drying: The passivated parts are almost dry (i.e. with just a few drops of water on the surface) after the passivation and rinsing steps. The drying can be done in forced air ovens and in case of strip material in continuous furnaces at temperature below 150°C or by blowing off. In case of a limited drying duration of 4-6 seconds temperatures up to 300°C are also possible.

Control & Correction of Bath Function

Testing the passivation capacity: Prepare a fresh 2% solution of potassium polysulfide (42-45%) and place the passivated parts in this solution for a few minutes - see appendix. Perfectly passivated surfaces must not show any dark discoloration. A slightly cloudy appearance is normal. Also place a non-passivated part into the solution to see the difference. In case of a poor passivation capacity, the concentration of Antitarnish-A-100 must be analytically determined and adjusted – see appendix.

If there is no improvement after having adjusted the concentration of Antitarnish-A-100 the passivation solution must be recreated due to impurities.

Further Process Recommendations

Pretreatment: The parts to be protected must be clean and free of grease and oxides. The parts should either be wet or should have an active surface when placed in the solution. Drag-in impurities from previous electrolytes should be strictly avoided by careful rinsing.

Removal of the passivation layer: The passivation layer can be completely removed by cathodic degreasing in an alkaline degreasing bath (such as ALBILEX®-ED-100).

Disposal of Spent Solutions

The working solution of Antitarnish-A-100 is not a hazardous substance. The active ingredients can be absorbed by active carbon and burnt with it. It is recommended to stir the spent passivation solution with 4g/L of active carbon for several hours at room temperature and to filter it afterwards.

Due to drag-in, silver and cyanide sometimes accumulate in the passivation solution. In this case a treatment for the oxidation of cyanide and the precipitation of the heavy metals is necessary.

Afterwards the spent solution may be discharged into the sewage system according to local regulations. The instructions of the local water / sewage authorities must be observed in any case.

Safety Instructions

For information on safety, please see the corresponding material safety data sheets. The valid accident prevention regulations and safety information must be observed.

Additional Operating Instructions

1. Never use a pipette to dose the Antitarnish-A-100. The high viscosity will result in an inhomogeneous product.
2. Do not filter the bath.
3. Do not warm up the solution to higher than 60°C, otherwise bath components will be destroyed.
4. Be sure not to carry any cyanide from silver plating process in the Antitarnish-A-100. This will reduce the functionality.
5. Make sure to apply a two-step rinse to maintain a shiny surface after the Antitarnish-A-100 process.
6. Do not dry at temperatures > 150°C (if limited to 4-6 seconds temperatures up to 300°C are allowed).

Additional Products

Antitarnish-A-POST-DIP

Function: Rinse improvement, avoids staining.
Package size: 1 L

ALBILEX®-ED-100

Function: Removal of passivation layer.
Package size: 1 kg

Antitarnish-A-TITRATION

Function: Chemical additive for the titration process to determine quantity of active components.
Package size: 1 L

APPENDIX

Analysis Methods for Antitarnish-A-100

1. The inhibitor concentration can be determined using the following method of analysis:

Equipment:	<ul style="list-style-type: none">– 250 ml Erlenmeyer flask– 50 ml volumetric pipette– 25 ml burette
Chemicals:	<ul style="list-style-type: none">– Sulfuric acid 30 %– Iodine solution 0.1 N– Sodium thiosulfate solution 0.1 N– Antitarnish-A-TITRATION
Method:	<p>Pipet 50 ml of the warm, homogeneous process solution into a 250 ml Erlenmeyer flask mixed with about 10 ml Antitarnish-A-TITRATION and add about 5 ml sulfuric acid (30%).</p> <p>Dilute this solution with 50 ml deionized water.</p> <p>Add 10 ml 0.1 N iodine solution and shake thoroughly leaving the sample in a dark place for about 15 min.</p> <p>Titrate the resultant red-brown solution with 0.1 N sodium thiosulfate solution until the red-brown color changes to the white color of the original solution.</p>
Calculation:	<p>Concentration of Antitarnish-A-100 (ml/L)</p> $= (10 - \text{consumption of } 0.1 \text{ N Na}_2\text{S}_2\text{O}_3) \times 6$

2. Method for testing the passivation capacity of a metal surface:

Chemicals:	<p>2% aqueous solution of potassium polysulfide (20 g potassium polysulfide 42 - 45% solved in 1.0 L deionized water.) A fresh solution should always be prepared before testing. The temperature should not exceed 25°C.</p>
Method:	<p>Dip the test sample (passivated part) and the control sample for 5 min in a 2% aqueous solution of potassium polysulfide, then rinse the parts under running water. Test a non-passivated part as a reference at the same time.</p>
Interpretation:	<p>Perfectly passivated parts should not show any dark color changes (spots). The control sample is used for checking the usability of the testing solution.</p>

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