

Antitarnish 615

Operating Instructions

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The user must observe the **safety hints and risk hints!**

Process for the antitarnish protection of Au, Ag, Rh, Pt, Pd based on nanotechnology

- Simple immersion process
- For decorative and technical applications
- Dirt and water repellent
- Protection against mechanical loads
- Produces good surface haptics

Characteristics

Antitarnish 615 is a medium based on nanotechnology for protecting gold, silver, rhodium, platinum and palladium against tarnishing. Treated surfaces will be protected from tarnish effects for a prolonged period.

A thin protective layer invisible due to its low thickness is applied by a simple immersion process.

It protects the basic material from oxidation and discoloration without adversely affecting the solderability.

The coating is chemically resistant, dirt and water repellent and has a long lifetime.

The antitarnish is biologically safe, kind to the skin and hypoallergenic.

The friction coefficient of the surfaces will be clearly reduced, thus lowering insertion and withdrawal forces and the susceptibility to welding of contacts.

Additional protection against scratches and abrasion will be produced which will not impede later treatment or repair by grinding and polishing, however.

The precious metal will remain recyclable and the coating does not have a value-decreasing effect.

Suitable for rack and barrel applications.

Bath type: Ethanolic, metal-free immersion process

pH-value: Neutral

Density: 0.79 g/cm³

Temperature: 30 °C (25 °C to 35 °C)

Immersion time: 3 to 5 minutes

Precious Metal: Changes

Colour:	Uninfluenced
Brightness:	Uninfluenced
Friction coefficient:	Reduced
Sliding properties:	Improved
Solderability:	Virtually uninfluenced
Contact resistance:	Virtually uninfluenced

Form of Supply

Bath makeup:	a) Antitarnish 615 Initial Concentrate 20 ml for 1 litre of solution Storage stability: min. 3 years The Initial Concentrate must be stored in a cool and dry place protected from direct sunlight.
Bath replenishment:	b) Antitarnish 615 Replenisher Solution Replenishment after analysis. To increase the concentration of active ingredient by 1 g/l, 20 ml of Replenisher Solution are required. Storage stability: min. 3 years The Replenisher Solution must be stored in a cool and dry place protected from direct sunlight.

Bath Makeup

Makeup sequence:	To make up 1 litre of immersion solution, fill 980 ml of ethanol (96 % to 99 %, denatured, e.g. 641 or 642) into the bath tank and add 20 ml of Antitarnish 615 Initial Concentrate. Before addition, the Initial Concentrate should be shaken well and warmed to completely dissolve the active ingredient. After warming to operating temperature, the immersion solution is ready for use.
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Operating Conditions

Concentration:	20 ml/l Antitarnish 615 Initial Concentrate per litre of ethanol
Operating temperature:	30 °C (25 °C to 35 °C) At higher temperature, the protective effect will be reached faster!
pH-value:	Neutral
Bath density:	0.79 g/cm ³
Concentration of active ingredient:	6.5 g/l (5 g/l to 7 g/l)
Parts agitation:	The parts should be sufficiently agitated in order to achieve uniform protection.
Bath agitation:	For uniform mixing and temperature distribution of the immersion solution, slow agitation by means of a pump particularly suitable for use with alcoholic liquids is advantageous.
Filtration:	Filtration through 1 µm filter cartridges is recommended but not absolutely essential, however. Attention, please note: Filtration only at operating temperature (30 °C)!
Time of exposure:	Immersion (electroless) 3 to 5 minutes
Material of tanks / accessories:	The tanks should be made of <u>static-dissipative</u> and alcohol-resistant plastics. A tight-fitting tank cover for preventing evaporation losses is required.
Holding devices for parts/racks:	With alcohol-resistant coating.
Lifetime:	Approx. 3 months with continuous operation of the immersion bath.

Process Sequence

Optimum process sequence:

1. Plate (plate with silver, gold etc.)
2. Static rinse
3. Rinse
4. Cathodic degreasing (containing cyanide)
5. Rinse
6. Acid dip
7. Rinse
8. Rinse (parts must be active)
9. Dry at 50 °C to 70 °C (there must not be any water adhering to parts and rack!)
10. Immerse warm parts in Antitarnish 615
11. Post-dip in ethanol
12. Rinse in deionized water
13. Dry in warm air at 50 °C to 70 °C

Pre-treatment of the parts:

For successful coating with Antitarnish 615, the surface of the metal objects to be coated must be clean, free from dust and oxide layers. The parts should be placed in the solution with an active surface. This is ideally reached by cathodic degreasing and drying of the parts.

Coating process:

The parts are coated in an immersion process. The preconditions for successful coating are the cleanliness of the metal object to be coated (also see "Pre-treatment of the parts") and the cleanliness of the coating tanks. Completely immerse the dry object to be coated in the immersion solution. Cover the coating tank with a tight-fitting lid to minimize evaporation losses. The object must remain in the coating solution for 3 to 5 minutes to ensure complete coating.

Post-dipping:

Remove the already coated objects and immerse them in the post-dip solution. When making up a new post-dip solution, add 0.1 ml/l to 0.2 ml/l of Antitarnish 615 Initial Concentrate. The post-dip solution can be used for filling up the antitarnish solution. Fill up the post-dip solution with ethanol. Finally rinse the objects with deionized water.

Drying:

Allow the parts to dry in room air or in warm air at approx. 50 °C to 70 °C.

If necessary, remove any drying stains by careful rubbing with a commercially available polishing cloth.

Reworking:

The protective film produced by Antitarnish 615 can be removed again either by mechanical reworking such as polishing or by longer cathodic degreasing (until re-wetting of the surface). After cathodic degreasing and subsequent rinsing, the parts can be coated with Antitarnish 615 again.

Bath Replenishment

With Antitarnish 615 Replenisher Solution.

Bath replenishment after analysis. To increase the concentration of active ingredient by 1 g/l, 20 ml of Replenisher Solution are required.

We recommend continuous bath replenishment according to throughput.

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Bath Monitoring and Correction

Analytical control:

See analytical method (available on request)

Simple function test:

Coat a sample with Antitarnish 615 and afterwards test the quality of the coating by wetting the sample with water. Successful coating will be indicated by a "contracting" of the water drops on the surface and a clean draining behaviour.

Testing the protective capacity:

The protective capacity can be tested by immersion in a freshly prepared 2 % solution of ammonium polysulphide. Immersion time up to 120 s, under ideal conditions even longer. The ammonium polysulphide solution can be prepared from e.g. 20 % (NH₄)₂S (Merck No. 105442) by dilution with deionized water (dilute 100 ml of 20 % solution to 1 litre with deionized water). After making up the test solution, allow it to stand for 10 to 15 min. Afterwards the test solution can be used for up to 8 hours.

Attention, important hint: If metal wires (e.g. copper wires) are used for hanging up the parts to be tested, a local cell will form falsifying the result!

Good protective capacity: Perfectly passivated parts must not show any dark discoloration anywhere on the surface. A slightly cloudy appearance is normal. For checking the activity of the test solution, use an un-passivated reference sample.

Poor protective capacity: Dark discoloration of the coating, or black stains on the parts. If the protective capacity should be poor, first check the efficiency of the pre-treatment. Then determine the concentration of Antitarnish 615 Concentrate analytically and adjust to specified value. If the protection should not be any good even then, the antitarnish solution must be freshly made up. The analytical method is available on request.

Influence of contaminants:

Water, titanium, aluminium, ruthenium and iron as well as iron alloys will adversely affect the coating quality to a considerable extent. If the solution should be heavily contaminated with these substances, the immersion bath must be discarded in accordance with the official disposal regulations.

Formation of foam or streaks:

If slight foam or streak formation should be observed on the surface of the immersion bath, heat the bath briefly to approx. 45 °C, then foam or streaks will dissolve again.



Warning:
Do not overheat to exclude risk of explosion!

Special Process Hints

Metals and alloys suitable for coating:

All pure metals and alloys of gold, silver, platinum, rhodium and palladium as well as similar metals are suitable for coating with Antitarnish 615.

If you should not know the composition of the alloy, coat a sample with Antitarnish 615 and afterwards test the quality of the coating by wetting with water. Successful coating will be indicated by a "contracting" of the water drops on the surface and a clean draining behaviour.

Titanium, aluminium, ruthenium, iron and alloyed stainless steels are not suitable for coating with Antitarnish 615.

Discoloration of the immersion bath:

The immersion bath may take on a dark (bluish-black) colour after heavy use. A slight discoloration will not affect the function of the concentrate adversely.

Reprocessing and disposal of spent solutions:

Reprocessing spent solutions is not possible.

The disposal of spent solutions must be co-ordinated with a **specialist disposal company**, it must be in accordance with the relevant waste management regulations.

A list of specialist disposal companies is available from the competent environmental authorities.

Equipment

Bath tanks: The tanks should be made of static-dissipative and alcohol-resistant plastics. A tight-fitting tank cover for preventing evaporation losses is required.

Heating: Adjustable Teflon-coated heaters with **safety temperature cut-out** suitable for use in alcoholic solutions in particular. Local overheating of the immersion solution should be avoided (temperatures exceeding 60 °C). Ensure sufficient recirculation of the bath when heating up the solution.



All electrical equipment coming into direct or indirect contact with either product or product vapours must be in accordance with the relevant explosion protection regulations.

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Filtration: Filtration through 1 µm filter cartridges is recommended but not absolutely essential, however.

Attention, please note: Filtration only at operating temperature (30 °C)!

Agitation equipment: Parts and/or immersion bath should be sufficiently agitated in order to reach uniform protection.

Racks/barrels: Only racks with alcohol-resistant coating or barrels made of alcohol-resistant materials may be used.

Exhaust system: An **exhaust system** for the immersion bath particularly suitable for extracting alcohol vapours is absolutely essential since combustible and explosive fumes may potentially be liberated.



If the immersion bath is heated strongly, formation of an explosive atmosphere is possible.

Note

Our information relating to the storage stability refers to storage in closed original storage containers under the conditions stated on the label.

General Safety Hints

Before starting to work with the product, the user of the immersion bath must have a competent person carry out a **hazard determination** and a **risk assessment** in order to assess the **risks posed by hazardous substances** and a potential **risk of explosion** in particular.

The user must have a competent person draw up in writing a documentation (**explosion protection document**) where the technical, organisational and personal protective measures are documented and checked for their efficacy with regard to preventing an explosion risk.

The user must observe the relevant **legal norms** pertaining to safety, health and environmental protection.

Prior to using the product and afterwards at regular intervals, every 12 months at a minimum, the user must be **advised** by a competent person of any possible risks involved in the handling of the product and the necessary protective measures to avoid or reduce these risks.

The user's observance of the technical, organisational and personal precautionary measures must be checked by a competent person at regular intervals.



Highly flammable

The user must observe the **safety hints and risk hints** in the **Safety Data Sheet** supplied with the product.

The user must observe the technical, organisational and personal precautionary measures for the handling of hazardous substances to prevent and reduce any risks.



When using the immersion bath, **explosive atmospheres** may potentially be formed.

The user must take and check for their efficacy all technical, organisational and personal precautionary measures to avoid a risk of explosion.

A documentation in writing (**explosion protection document**) describing the technical, organisational and personal precautionary measures to avoid and reduce a risk of explosion must be available.



All **electrical equipment** coming into contact with either product or product vapours must be in accordance with the relevant **explosion protection regulations**.



Environmentally hazardous

Please observe the environmental regulations for use and disposal of wastes.



If you should have any **questions on safety, health and environmental protection**, please contact the relevant government **advisory offices** or contact the **manufacturer** directly.

We will gladly advise you competently!

Reference to

Troubleshooting table:	Available on request
Analytical control:	Methods available on request
Wastewater treatment:	Method available on request
Reprocessing/recovery:	Method available on request

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