



# T-PRO20

ANTI-TARNISH CHEMICAL PASSIVATION FOR OXIDIZATION RESISTANCE (1:20 CONCENTRA

## GENERAL INFORMATION

T-PRO20 is the concentrated version of T-PRO anti-tarnish chemical passivation. It is sold in a 1 liter package that yields 20 liters of ready-to-use solution when mixed with deionized water. T-PRO, part of the T-FENDER line, is a chemical passivation agent developed for metallic substrates which naturally have poor corrosion resistance, like silver, brass, bronze, low karat gold, and some electroplated layers. By applying T-PRO to these metals, resistance to oxidation (tarnish) is dramatically elevated by providing an invisible layer which seals the substrate from external elements. Laboratory tests have proven that chemical passivation protects from corrosion originating from hydrogen sulfide, UV radiation, synthetic sweat, and humidity. T-PRO is easy to use, not requiring any electrical current and works simply by heating up the product and dipping in your object. By adding T-SALT, Legor Group conductive salt solutions, T-PRO can also be used by galvanic process to increase its protection level.

### Product form

Product's pH	Acidic/Neutral
Solution form	Concentrated
Plating solution color	White
Storage time	18 months
Volume	1 liter

### Deposit data

Solution appearance	Totally transparent
Plating solution color	Transparent
Thickness range [µm]	0,001 - 0,010



### Operating data

#### RANGE

#### OPTIMAL

	RANGE	OPTIMAL
pH	5-7 and 3-4 after salts dissolution (fo	4.0
Voltage [V]	3.5 - 4.5 (electrolytic way)	4.5
Working temperature [°C]	55-60	55
Exposure time (sec)	5 - 20 (minutes)	7.0
Anode type	Mixed metal oxide (MMO) or Titaniu	
Agitation	Moderate	

**PREPARATION**

Heat the T-PRO20 to 60-65 °C for approx. 30 to 60 minutes (bain-marie) until a completely waterwhite solution has formed. **DO NOT ADD THE T-PRO20 WHEN COLD OR AT ROOM TEMPERATURE!** The active ingredients are insoluble at low temperatures, you risk obtaining a sub-optimal ready-to-use solution.

To prepare the ready-to-use T-PRO solution add the 1 liter solution of T-PRO20 in 19 liters of deionized water.

Switch on the exhaust system and start to mix the concentrated form with deionized water until getting an almost homogeneous solution.

**Standard Use:** For optimum results the solution must be in a transparent state. Heat up to 55-60° C. The solution becomes transparent in this range: higher or lower temperatures will make the solution turbid.

**Electrolytic use:** In case of electrolytic usage through direct current application, add 2.5 g of T-SALT conducting salts per liter of ready-to use solution and wait their complete dissolution. Check the pH which has to stay around 3.5. If too low adjust it with the addition of 0.2 g/l of sodium hydroxide. **IMPORTANT:** To achieve optimum protection, overdosing of sodium hydroxide should be avoided. Therefore we recommend a dilute solution (e.g. 20 g/l NaOH). Then heat up at the same temperature of the standard usage and stir for 15-30 minutes. At this point the solution is ready to be used under electrolytic way. Apply a voltage using a DC power-rectifier in the range of 3.5 - 4.5 V for 5-6 minutes.

**EQUIPMENT**

For a correct use of this product you are advised to use PVC, polypropylene or PYREX glass tanks provided with thermostat-controlled heaters. Do not use stainless steel or iron tanks.

**PRODUCT USAGE**

To get optimum results please follow these following steps:

**TREATMENT OF SILVER PLATED PIECES**

1. Rinse and wash in D.I. water
2. Rinse
3. Acid neutralization
4. Rinse

5. **STANDARD USAGE:** Immersion in T-PRO for 10 minutes (with moderate agitation)

**ELECTROLYTIC USAGE:** Immersion in T-PRO with T-SALT conducting salts (previously dissolved in) for 5-6 minutes (with moderate agitation) at about 3.5 - 4.5 V

6. Rinse with demineralized water
7. Rinse in hot water (70-75° C)(\*)
8. Dry with hot air (avoid drying systems that could remove the passivation)

**TREATMENT OF OXIDIZED AND/OR SULFURATED PIECES**

1. Electrolytic degreasing
2. Rinse
3. Acid neutralization
4. Rinse

5. **STANDARD USAGE:** Immersion in T-PRO for 10 minutes (with moderate agitation)

**ELECTROLYTIC USAGE:** Immersion in T-PRO with T-SALT conducting salts (previously dissolved in) for 5-6 minutes (with moderate agitation) at about 3.5 - 4.5 V

6. Rinse with demineralized water
7. Rinse in hot water (70-75° C)(\*)
8. Dry with hot air (avoid drying systems that could remove the passivation)

⚠️(\*) In case of items with complicated designs, liquid residuals can be removed more efficiently by rinsing in very hot water (85° C).

(\*\*) If you are dealing with Argentium alloys, never use electrolytic degreasing. Use only neutral pH detergents (7-9) by simple dipping or by ultrasonic bath. Optimal cleaning results may be achieved by using the LEGOR CLEANING KIT system.

**SUPPLEMENTARY INFORMATION****SPECIAL PROCESS HINTS**Pre-treatment:

For successful coating with T-FENDER product line, the surface of the metal objects to be coated must be clean. Any drag-in from preceding process steps (e.g. silver electrolyte) must be avoided, otherwise the lifetime of the Antitarnish will be reduced and a new make-up will become necessary.

Coating process:

The parts are coated in an electrolytic immersion process. Immerse the object to be coated in the Antitarnish and apply a voltage of 3.5 volts. We recommend a coating time of 5 minutes.

**Hint:** if the voltage is too high, gaseous hydrogen will form on the parts. The gas bubbles forming will inhibit the formation of a homogeneous antitarnish layer. In this case lower the voltage in 0.5 volt increments!

Optimum voltage:

Coat the parts at 4.5 volts and test the protection e.g. in a 2 % potassium sulphide solution. Then repeat the test with 4.0 / 3.5 / 3.0 and 2.5 volts to determine the optimum operating voltage.

Post-treatment:

After coating, sufficiently rinse the objects and then dry them at approx. 60 – 70 °C (hot-air oven, centrifuge, compressed air).

Production stops:

After longer production stops, we recommend a special replenishment of 10 ml/l of T-PRO20 initial concentrate or 4 ml/l of T-PRO50.

Reworking:

T-PRO must not be dragged into the electrolytic degreasing solution, the wetting agents contained are water-repellent and may cause wetting problems in the degreasing solution. For this reason, a separate cathodic degreasing solution should be used for removing T-PRO if necessary. Current densities of 5 – 10 A/dm<sup>2</sup> are applied for 1 - 2 minutes. The Antitarnish has been completely removed when the surface can be rewetted.

Anodes:

We recommend mixed metal oxide anodes MMO 187 SO. They should be occasionally cleaned in a separate degreasing solution.

Contacting:

For optimum coating, light and floating parts should be thoroughly contacted. With poor contacting, protection will be strongly reduced.

Turbidity:

After longer idle times, turbidities may occur. We recommend heating the electrolyte to 60 – 65 °C for 30 – 60 minutes in such a case and afterwards allowing it to cool down to operating temperature of 55 °C.

Electrolyte replenishment:

To increase and restore the concentration of the active principles, replenish with warm (60-65°C) initial concentrate solution T-PRO20. Stir the T-PRO20 solution well as it must be completely transparent and clear before use it as replenisher. The general rule is that to add it in the amount of 2-5 ml per liter of ready-to-us solution every week, when the passivating solution is continuously working.

**SAFETY INFORMATION**

Classification and designation are noted in the Material Safety Data Sheet (according to the European legislation). The safety instructions and the instructions for the environmental protection have to be followed in order to avoid hazards for people and environment. Please consider the explicit details in our Material Safety Data Sheets.

**DISCLAIMER**

All recommendations and suggestions in this bulletin concerning the use of our products are based upon tests and data believed to be reliable. Since the actual use by others is beyond our control, no guarantee expressed or implied, is made by Legor Group, its subsidiaries or distributors, as to the effects of such use or results to be obtained, nor is any information to be construed as a recommendation to infringe any patent.