

PLATING PRODUCTS IND PVT LTD

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Technical Data Sheet

BOX™ 511

Room Temperature Oxidizing/Antiquing Solutions for Brass, Bronze & Copper

The series of **BOX** products gives the metal finisher a wide range of choices for color development in the oxidizing of copper and its alloys. The liquid concentrates are diluted with water and by varying the concentration and length of immersion, a range of colors can be developed.

BOX 511:

15% to 20% by volume solutions produce black to blackish-brown US 10B finishes on copper and brass with immersions of 1 to 3 minutes. Diluted 5% to 10% by volume solutions produce lighter Flemish and statuary bronzes with 1 to 3 minutes of immersion. Desirable underlying red tones revealed upon highlighting the brown tones.

EQUIPMENT REQUIRED

Acid resistant tanks, tumbling barrels, baskets, hooks, and racks must be used with the **BOX 511** and **P-Pik** solutions. Plastic, plastic lined, rubber lined, glass or stainless steel are suitable. Mild steel may be used for the cleaning, rinsing and sealant tanks. A mild steel immersion heater is required for the **E-Kleen** tanks. A filtration system may be required with the **BOX 511** solution. In some infrequent installations an ion exchange system may be required for the rinse water after the **BOX 511** solution to remove heavy metals.

FINISHING PROCEDURE

1. Surfaces must be free of oxides and residual plating solutions.
 - a.) Plated surfaces should be thoroughly rinsed with cold water followed by another short rinse in a room temperature 5% Sulfuric Acid solution or **PPI's P-Pik 215** acid salts(5 to 10 gm/ltr) to neutralize residual alkaline plating solutions.
2. **Oxidizing Brass, Bronze, and Copper**

Immerse pieces, while still wet from the preceding rinse in the **BOX 511** solution for the length of time necessary to produce the desired color. Rotating perforated plastic barrels are recommended for processing small parts. When using dip baskets, the parts should be agitated

when immersed in the solution to break air bubbles and to assure solution contact with all surfaces

3. Rinse thoroughly in bottom fed overflowing cold water rinse. A stagnant hot water rinse can be used to speed drying, but it should be preceded by a short cold water rinse to minimize staining. Hot rinses should be maintained at 70° to 80°C and dumped periodically or overflowed very slowly. A rinse aid may be helpful in eliminating water spots.
4. Force drying in heated spin dryers, ovens or cob meal will minimize streaking and staining. Large architectural panels should be wiped dry or blown dry. Small parts do not require drying if they will be barrel or vibratory burnished immediately after rinsing.
5. "Highlighted" or relieved antique finishes are produced by buffing, scratch brushing, barrel or vibratory burnishing.
6. Sealing the finish with a protective topcoat will enhance the color and impart corrosion and abrasion resistance. A clear acrylic lacquer topcoat such as **E-Tec 520** produces a hard, dry US 10L finish. **E-Tec 501** produces an oily US 10B finish.
7. For a hand applied wax topcoat we use **RENWAX**.

SOLUTION MAINTENANCE

The **BOX 511** solutions are gradually depleted through use, but may be replenished indefinitely with periodic additions of **BOX 511** concentrate. The strength of the solution and the amount of concentrate to be added can be determined by titrating the solution per burette titration control procedure **CP-1** available from **PPI**, or by using a simple dropping bottle method outlined below. The strength of the solution can also be fairly accurately maintained by the immersion time required to produce the desired color. As the time increases, add sufficient concentrate to reduce the time to your established standard. A sample of a freshly prepared bath should always be retained as a control.

The frequency of additions will depend upon the volume of work processed through the solution and the color developed. Producing the darker black and brown colors will consume more than the lighter colors. Coverage will be on the order of 125 sq/ft. per liter of concentrate added to the bath for blacks, and 200 sq/ft. per liter for the light browns.

For optimum results, the strength of the solutions should be maintained at 85% of its original strength or greater at all times and frequent small additions are recommended. With automatic lines a bath history should be established while running the first several (15 to 25) racks or barrels, and by titrating the strength after each 5 loads to determine the point at which the solution is depleted approximately 10-15% and replenishment is necessary. Timed metering pumps, triggered by the load, are recommended for replenishing the solution and maintaining a consistent strength. If the ambient temperature in the plant varies considerably, then electric heaters may be used to maintain a consistent solution temperature of 20° to 30°C.

The life of the solution and coverage will be increased by continuous circulation and filtration through a 50 micron filter. An alternative with smaller baths is to allow the solid by-products of the reaction to

settle to the bottom of the tank and transfer the solution to a plastic holding drum to be retained for recharging the tank after the solids have been removed.

DROPPING BOTTLE CONTROL PROCEDURE

A sample of a freshly prepared production bath should always be taken as a control solution prior to running any parts through the bath. If a sample was not taken, a laboratory prepared solution at the same concentration may be used as the control solution. Titration of this “new” solution will provide the figure for **D₁**.

1. Transfer a 5 ml sample of the production bath into a 125 ml Erlenmeyer flask.
2. Dilute with water to the 50 ml mark.
3. Add 2 ml 6N (1:1) Hydrochloric Acid to the flask.
4. Add 4 ml of the 15% by weight Potassium Iodide solution.
5. Add 2 ml of Starch solution. The solution will become a dark blue to almost black color.
6. Add the 0.5N Sodium Thiosulfate solution, from the dropping bottle - drop by drop - counting the drops while swirling the flask.
7. The end point is marked by a sudden change in color from dark black to light brown.

Note: Upon standing, the light brown color will turn dark again, but additional Sodium Thiosulfate solution should not be added. The first end point is correct.

8. Calculate the amount of concentrate to be added as follows:

$$C_2 = D_1 - D_2 (C_1)$$

D₁

C₂ = Concentration in gallons to be added to the bath.

D₁ = Number of drops of Sodium Thiosulfate used to titrate the new production bath.

D₂ = Number of drops of Sodium Thiosulfate used to titrate the used production bath. **C₁**

= Volume of concentrate in gallons used to make up the original “new” bath.

A test kit for the above procedure is available from **PPI**.

CAUTION

The **BOX 511** solutions are mildly acidic. Avoid contact with eyes, skin, and clothing. Wear eye shields, protective gloves and aprons when preparing solutions and while working with the solutions. Do not mix the **BOX 511** solutions with alkaline materials, cyanide containing materials,

or any other chemical substances. The **BOX 511** solutions are toxic if taken internally. Do not work with the **BOX 511** solutions without first reading and understanding the **MATERIAL SAFETY DATA SHEETS** furnished by **PPI**.

PACKAGING

One (1), five (5), (35) and 200 liter non-returnable containers.

IMPORTANT NOTICE : for industrial use only.

The following is made in lieu of all warranties , expressed or implied , including the implied warranties of merchantability and fitness for purpose.

Neither seller nor manufacturer shall be liable either in tort or in contract for any loss or damage , direct , incidental or consequential arising out of the use or the inability to use the product.