



ZINC PLATING

**FOR FULL
PROTECTION
OF**

IRON STEEL COPPER BRASS

THE PLATING SOLUTION

If the water in your location is hard, or has other issues you should use demineralised water to make up the solutions involved and to rinse with. Avoid static water sources such as water butts, dehumidifiers etc. The solution is made up in the tank, this must be plastic, polythene or stainless steel. If stainless steel is used it is important that the support clips are electrically isolated from the tank. This can be achieved by folding a plastic insulator over the edge of the tank where the clips are arranged or by using **plastic support clips**.

The zinc salts are dissolved into the tank using **warm** water, **one kg to 5 litres** of water. It is most important that protective gloves, eye glasses and mask are worn during this operation. The salts contain hazardous chemicals. When fully dissolved the solution is a clear, colourless liquid. The powder will not dissolve if the water is too cold. The **Zinc 757** should be added to the zinc solution when the salts are fully dissolved. It is supplied in a **250ml** bottle, which is sufficient for a **10 LITRE** plating solution. Use only half, **125ml**, for a **5 LITRE** solution.

The solution has been designed to operate best between 15 and 50 degrees C. so no heater is required if the equipment is used at room temperature. Top up losses of solution with clean water and drain and filter as required to remove sediment which may build up in use. When not in use the solutions must be stored in sealed plastic or polythene containers, clearly marked as to their contents.

RINSING WATER

A tank of clean water will be required for rinsing each plated item at various points during the later stages of the procedure.

HEALTH & SAFETY

Please read and observe all safety warnings within this booklet and contained on labels attached to some products supplied.

Wear gloves if coming into contact with the salts or solution.

Wear a mask, particularly when dealing with the dry salts which can produce hazardous dust. **Do not eat, drink or smoke whilst operating the system. Do not allow children near to any of the materials or equipment. Please wash your hands after handling any of the equipment or chemicals.**

PLATING METHOD

Three tanks are needed to complete the whole process.

Tank (1) the plating tank shown in detail on the next page.

Tank (2) the rinsing water tank

When the plating tank has been assembled as shown and described on the next page, the Items to be plated **MUST** be thoroughly cleaned and degreased, followed by washing in hot soapy water. All traces of soap must then be removed by rinsing in clean water. Finally the parts **MUST** be treated with **BARVIC** cleaner / scourer / preparer, (**see preparation of parts**). The voltage selection must now be calculated and set with reference to the **TABLE** inside rear cover of this booklet. A croc clip lead should now be attached to the item to be plated and the other end of this lead clipped to the cathode bar. The item can now be lowered into the plating solution. This **order is important** as it will allow the current to flow immediately in the plating tank as the part is lowered preventing the item from sitting in the corrosive solution without plating taking place. Check after a few minutes that plating is taking place by raising each item momentarily from the solution using the attached lead, **do not touch the item or the solution**. When the items have been plated to the required level disconnect the electrical supply from the tank by unplugging the power unit from the current control unit. Raising each item in turn from the solution using the croc clip lead (**do not touch by hand**) rinse thoroughly in the water tank.

ASSEMBLY OF THE PLATING TANK.

There are two bars supplied together with four support clips, which are used to support the anodes and the items to be plated. **The bars are pushed through the holes in the support clips**

THE ANODE BAR RED POSITIVE

The anode bar is installed first and fits across the centre of the tank. It is installed in such a way that the whole of the centre section is sleeved against any electrical contact. There is a support clip at each end clipped onto the tank edges and the sleeving is between the two support clips, covering the whole of the bar between the two clips.

Each zinc anode is now attached to a croc clip lead and suspended into the solution by tying the lead onto the anode bar at the required length, one at each end of the anode bar as close as possible to the support clips. It is vital that these anodes do not come into contact with the items to be plated.

The anodes are suspended into the solution as far as possible, but the croc clips must not contact the solution.

The two croc clips now remaining which are in electrical contact with the anodes are now clipped onto the metal part of the anode bar which overhang the outside of the tank, close to each support clip.

The anodes will be supplied with a **POSITIVE** supply.

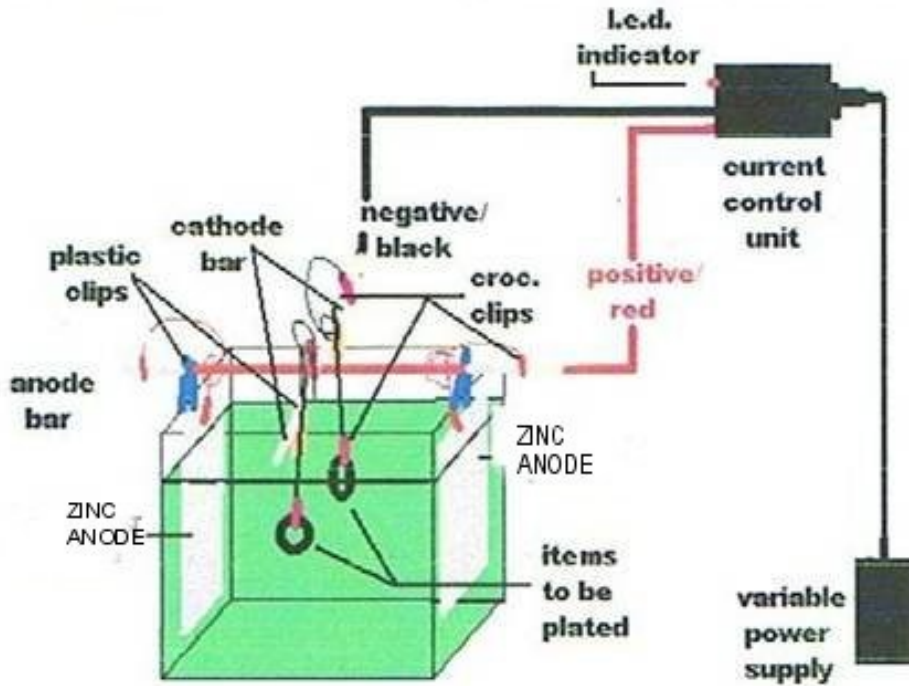
THE CATHODE BAR BLACK NEGATIVE

The cathode bar is suspended in a similar manner and can lie in the same direction or at 90 degrees to the anode bar.

The purpose of the cathode bar is to provide a suspension point for the items to be plated and to carry the electric current to those items. This bar is suspended across the tank using two support clips, one at each end, and each item to be plated is suspended into the solution using a croc. clip lead for each item, tying off each croc clip lead to a sufficient length to ensure full submersion of the item. It is quite acceptable for the croc clips to enter the solution. It is important that the various items do not touch each other and VITAL THAT THEY DO NOT TOUCH THE ANODES.

Each item to be plated will be supported in the solution by tying off the croc clip lead onto the cathode bar at the required length and connecting the free end of each croc clip lead to the cathode bar at any point along its length. This will ensure that each item to be plated is connected to the **NEGATIVE** supply.

ZINC PLATING TANK



ELECTRICAL CONNECTIONS.

The red and black wires from the current control unit are now connected to their respective bars. **RED to RED sleeved anode bar**, which has the zinc anodes connected. **BLACK to the cathode bar** which is supporting the items to be plated. The connectors are supplied fitted to the wires and should be attached to the bars using a small terminal screwdriver. All that remains now is to plug the connector from the variable power supply into the regulator box and plug the variable power supply into the mains supply

PREPARATION OF THE PARTS.

All previous plating must be removed from any metal items before attempting to re-plate. All traces of rust, oil, grease and other surface contaminants must also be removed before plating. See rear cover for notes on blasting.

Plating will not cover any scratches or imperfections on the surface of items to be plated. It is important to be completely satisfied with the finish of the surface before starting the plating process. Frost Art can supply a wide range of metal finishing products to achieve satisfactory results. It is very important that all oil or grease is completely removed from all items to be plated. After finishing to the desired level it is important to prepare the surface with BARVIC cleaner / scourer to ensure satisfactory adhesion of the zinc to the surface. Sprinkle a small amount onto the surface or make up a paste with clean water and using a moistened, lint free cloth rub all over the surface to be plated, use a toothbrush on areas with recesses or are difficult to reach. Finally rinse in clean water and attach to a croc. clip lead, check for a continuous film of water over the areas to be plated and lower into the solution whilst still wet. Attach the croc. clip lead to the cathode-negative bar.

GENERAL DESCRIPTION

The system has been designed from scratch to provide an easy and safe method for the amateur to achieve high quality zinc plating at low cost. All the latest developments in chemicals and electronics have been integrated into the design

to produce excellent results. The system utilises modern electronic control of the plating current to the tank. There is no danger of electric shock as the voltages and currents involved are extremely low. The plating currents calculated and included in the TABLE are applicable only to these zinc salts. These salts have been

specially designed for this system. To protect the system from damage, under fault conditions a special electronic cut-out circuit has been employed. Under fault- conditions, or where too high a voltage has been selected for plating, the supply to the tank will be automatically interrupted. This situation will be indicated by the red indicator on the current regulator unit, beginning to flash. See the list of faults below.

The circuit is easily reset to normal working by disconnecting the supply to the tank for a few seconds then re-connecting. The most convenient place to disconnect is at the plug into the current regulator unit.

FAULTS CAUSING AUTOTRIP.

Too high a selected voltage for the area to be plated (refer to table).

Items to be plated in contact with anodes or anode bar (rearrange).

Wrongly connected supply to tank. Check, **RED positive to anode bar,**

BLACK negative to cathode bar.

Short circuit between anode bar and cathode bar.

TABLE OF PARTS TO BE PLATED

AREA OF PARTS TO BE PLATED		SWITCH POSITION
SQUARE INCHES	SQUARE CENTIMETRES	D.C. VOLTS
5	35	1.5 or 3v
15	100	3 v
20	140	4.5 v
30	200	6 v
40	280	6 v
50	350	6 v
OVER 50	OVER 350	See below.
Always run the system at a lower, rather than higher voltage for best results. For areas in excess of those stated in the table allow longer periods of plating (up to 8 hours). If the plating needs to be heavier then re-scour, and re-plate for a further period.		

**Plate at the above rates for up to 4 hours for a protective finish.
 For a heavier finish plate for up to 8 hours. If it is more convenient to plate overnight, then plate for a longer time at a reduced voltage setting.**

Observe all safety warnings in this booklet and on labels attached to some products used in this system.

Check that the **red** wire is connected to the **anode bar**.
 Check the **black wire** is connected to the **cathode bar**.
 Check that the **anodes** are connected to the **anode bar**. And that the croc. clips holding the anodes are not in contact with the solution.
 Check that the **items to be plated** are connected via the croc. clip leads to the **cathode bar**.

WHEN PLATING IS COMPLETED.

Dismantle the various parts, rods clips leads etc. wash thoroughly in hot water to remove all traces of solution.

Remove the anodes in the same way, wash in hot water and store for future use.

Store the solution for future use in a sealed plastic or polythene container, clearly marked as to its contents.

ALWAYS Observe all labels & warnings

Wear a mask and gloves provided when handling the salts or the resultant solution.

Wash you hands after using the system.

NEVER Inhale the dust from zinc salts.

Eat, drink or smoke whilst using the system.

Allow children near the system or it's components at any time.

CLEANLINESS It is vital that the equipment and solutions are kept clean and free from contamination or poor plating will result. Oil or grease are sure to cause problems. Cover tanks between plating sessions and store solutions in clearly marked, sealed containers when out of use.

BLASTING

Blasting is a commonly used process to prepare items for further treatments, but it is not the best process if the item is intended for plating for the following reasons.

- 1 Old plating is not always successfully removed by the blasting process, despite the appearance of the metal surface after blasting is complete. It can appear as if the uniform surface that results is the base metal, usually steel, but plating can be very resistant to blasting, often needing many hours to remove it fully.
- 2 Even if blasting is successful at removing the rust or old plating it will often leave the resulting surface passive, (resistant to accepting new plating.)

Wherever possible other methods of removing rust or plating should be employed such as mechanically on a wire wheel, or chemically using an electrolytic stripping kit, or a chemical dip stripping solution suitable for the plated metal to be removed. If blasting is employed in the preparation process then the surface should be further treated with a wire wheel or an acid activation dip prior to scouring and plating. To ensure an active surface. FROST can supply equipment suitable for these procedures