

**FOR THE PROTECTION  
OF ALUMINIUM**

**2 LITRE ANODISING KITS**

## **WHAT IS ANODISING ?**

Anodising is the creation of an oxide layer on the surface of aluminium by electro-chemical means. This oxide layer protects the underlying metal and prevents further corrosion from taking place. An additional benefit of this process is that the oxide layer that is created will accept certain dyes, thus allowing aluminium items to be finished in a wide range of colours.

## **GENERAL DESCRIPTION**

The system has been designed from scratch to provide an easy and safe method for the amateur to successfully anodise aluminium\* at a low cost. All the latest developments in chemicals and electronics have been integrated into the design to produce excellent results. The system utilises electronic control of the current supplied to the anodising tank, and due to the low voltage involved there is no risk of electric shock. The power supply has built in electronic protection to prevent damage should fault conditions arise.

\* Aluminium items that have been cast are not able to be anodised.

## **THE TANKS**

Four tanks are needed to complete the whole process.

- TANK 1 the anodising tank
- TANK 2 the rinsing tank (cold water)
- TANK 3 the dyeing tank (optional)
- TANK 4 the sealing tank (boiling water)

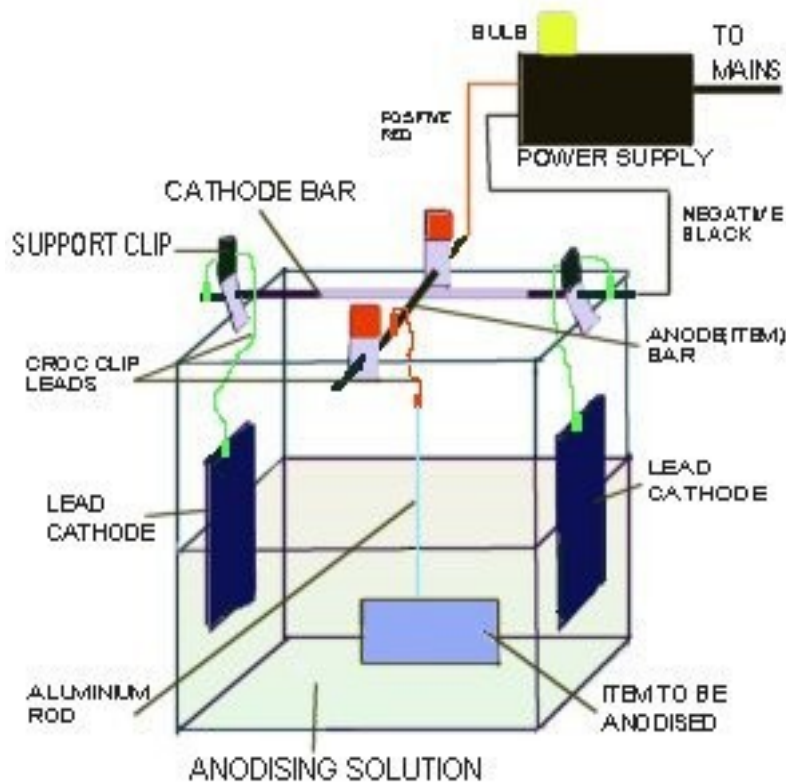
The sealing tank needs to be able to store boiling water and be large enough to accommodate the item being anodised. The anodised part does not need to be fully submerged in the boiling water, but must be rotated so that the whole surface receives the full duration of sealing time .

# ANODISING TANK

## WARNING

**THE ANODISING SOLUTION CONTAINS SULPHURIC ACID. ALWAYS WEAR GLOVES, EYE PROTECTION AND A MASK WHEN HANDLING THIS SOLUTION AND WHILE ANODISING IS TAKING PLACE. ANODISING SHOULD ONLY TAKE PLACE IN A WELL VENTILATED AREA, AWAY FROM CHILDREN, PETS AND OTHER CHEMICALS. DO NOT EAT, DRINK OR SMOKE OR USE NEAR OTHER SOURCES OF IGNITION.**

The anodising tank should be set up as in the diagram below.



### ASSEMBLY OF THE ANODISING TANK

The anodising solution is supplied in 1 litre bottles and they are ready to be used. They should be poured carefully into the tank before the rest of the set up is undertaken. **PLEASE NOTE THE WARNING GIVEN PREVIOUSLY.** There are two bars supplied together with four support clips, which are used to support the cathodes and the items to be anodised. The bars are pushed through the holes in the support clips.

### THE CATHODE BAR BLACK NEGATIVE

The cathode bar is installed first and fits across the centre of the tank. It is installed in such a way that 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 most of the bar between the two clips.

Each lead cathode is now attached to a croc. clip lead and suspended into the solution by tying the lead onto the cathode bar at the required length, one at each end of the cathode bar as close as possible to the support clips. **It is vital that these cathodes do not come into contact with the items being anodised. The cathodes 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 contact with the cathodes are now clipped onto the metal part of the cathode bar which overhang the outside of the tank, close to each support clip.

The cathodes will be supplied with a **NEGATIVE** supply.

### **THE ANODE BAR RED POSITIVE**

The anode bar is suspended in a similar manner and lies at 90 degrees to the cathode bar. The purpose of the anode bar is to provide a suspension point for the items to be anodised and to carry electric current to those items. This bar is suspended across the tank using the two support clips, one at each end, and each item to be anodised is suspended into the solution using a croc. clip lead and aluminium rod for each item, tying off the croc. clip lead to a sufficient length to ensure full submersion of the item. **It is vital that the RED croc. clip lead DOES NOT come into contact with the anodising solution.** Large items that are too heavy to be supported by a croc. clip lead can be connected to the anode bar by attaching a longer length of aluminium rod to the item to be anodised and wrapping it around the anode bar. If the croc. clip lead is used, the free end is connected to the anode bar at any point along its length. **It is important that if more than one item is in the tank that they do not touch each other or the lead cathodes.**

The items to be anodised will be supplied with a **POSITIVE** supply.

### **ELECTRICAL CONNECTIONS**

The red and black wires from the power supply are now connected to their respective bars.

**RED** to unsleeved anode bar which supports the item to be anodised. **BLACK** to the cathode bar which supports the lead cathodes. 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 power supply into the mains.

### **ASSEMBLY OF THE DYEING TANK (optional)**

#### **NO ELECTRICAL CONNECTIONS ARE MADE TO THIS TANK**

The dye is supplied in a 250 ML bottle and should be added to 2 litres of clean water to make a 2.25 litre mix in the dyeing tank. The dye is more readily absorbed at higher temperatures up to 30 degrees C, so if a deep colour is to be achieved, or to be sure the resultant colour is satisfactory it is recommended to warm the dye solution for the 20 minute dyeing stage, especially if the room is cold where the dyeing is taking place.

If possibly the item being dyed should be raised off the bottom of the dyeing tank to ensure full dye coverage. The dye can be occasionally agitated manually using a stirring implement to also help to ensure an even dye coverage.

The parts can be suspended using a croc. clip lead, aluminium rod or other means as no electrical connection is necessary. Whatever method is used, it is important that the flow of

dye is not restricted to the area where the connection is made as this will result in an area of weak colour or no colour at all.

## THE SEALING TANK

The sealing tank needs to hold boiling water and should be large enough to allow the whole of the anodised part to be submerged below the surface of the boiling water for the required time. This may be achieved by rotating the part in the boiling water during the sealing process.

## PREPARATION OF PARTS

### **WARNING**

**THE ONLY METALS THAT CAN ENTER THE ANODISING SOLUTION ARE LEAD AND ALUMINIUM. ANY OTHER METAL PARTS MUST BE REMOVED FROM THE ITEM BEFORE IT GOES INTO THE ANODISING TANK.**

It should first be determined that the aluminium part has not been previously anodised as an anodised surface will not allow the process to occur. The best way to test this is to measure the electrical surface resistance of the aluminium. A low resistance indicates a non anodised surface, whereas a high resistance indicates an anodised surface. A suitable testmeter is available from Frost A.R.T. (This electrical conductivity test can be used to determine whether the anodising process has been successful.)

The item to be anodised can be attached to the aluminium rod that will provide it's electrical connection in one of two ways. The most convenient way is to use an existing hole in the item, pass the rod through and wrap around several times to ensure a good mechanical as well as electrical connection. If this is not possible then a small hole can be drilled in an unobtrusive place and the flattened end of the rod screwed into this hole.

**THE ANODISING PROCESS CAUSES THE ALUMINIUM TO BECOME NON -CONDUCTIVE, THEREFORE THIS CONNECTION MUST BE GOOD ENOUGH TO REMAIN THROUGHOUT THE ANODISATION PROCESS AS ONCE BROKEN IT IS IMPOSSIBLE TO REGAIN.**

**THE PART OF THE ROD THAT IS IN CONTACT WITH THE ANODISING SOLUTION WILL ALSO BECOME NON CONDUCTIVE AND SHOULD BE DISCARDED AFTER USE .**

It is important to be completely satisfied with the surface finish before starting the anodising 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 anodised. After finishing to the desired level it is important to prepare the surface with BARVIC cleaner/scourer to ensure satisfactory anodisation. 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 anodised. Use a toothbrush on areas with recesses or that are difficult to reach. Finally rinse in clean water and attach the free end of the aluminium rod to a croc. clip lead or wrap it around the anode bar. If a croc clip lead is used this should be connected to the anode bar. The item is now ready to be lowered into the solution.

## ANODISING

Large items may cause the bulb to light while anodising is taking place, whereas small items may not light the bulb at all. The way to tell if current is flowing in the tank if the bulb is not lit, is to observe the lead cathodes where surface action should be visible. If no action is observed check all of the electrical connections.

The items can be left anodising for anything up to 3 hours, although 1-2 hours may be sufficient especially for smaller items if a strong depth of colour is not required. After anodising is complete the part should be removed from the tank and placed straight into the rinsing tank. After being **THOROUGHLY** rinsed the item should go either straight into the dyeing tank, or if no colour is required straight into the sealing tank.

## DYEING

The item should be suspended so that it is not in contact with the tank or any other parts while being dyed. 20 minutes is the usual length of time required to produce a full colour, but if a weaker colour is desirable then a shorter time can be used. After dyeing is complete the item should again be rinsed before going into the sealing tank.

## SEALING

Both dyed or uncoloured items are sealed in the same way by immersion in boiling water for 20 to 30 minutes. It is important that the whole surface of the item receives this duration of sealing time. It is normal during this stage for a small amount of dye to leach out into the sealing water.

After being sealed the item can be waxed and polished gently to bring out the colour.

The anodising solution should be stored in it's original container, which should be clearly marked as to its contents. The cathodes and other parts of the kit that have come into contact with the anodising solution should be thoroughly rinsed before being dried and stored away.