

Automatic chemical dosing with assistance on line

ACD DOSING SYSTEM



The addition of chemicals into the tanks in an anodizing line is nowadays possible in an automatic mode.

In order to add all chemicals automatically these must be in liquid form and contained in small containers (i.e. 1 m³ volume)

If some chemicals are supplied in powder form, the containers for the automatic dosing will be connected to containers equipped with agitators, in which the powder products and D.I. water will be added.

The containers containing the liquid chemicals ready for automatic dosing are equipped with:

- 1) Minimum/maximum level meter with alarms
- 2) PVC pipe connected to a dosing pump
- 3) PVC pipe between dosing pump and the chemical tank

DESCRIPTION OF THE SYSTEM

A) Liquid products for "non electrical" tanks.

The dosing pump is regulated according to the following relation:

$$\text{liters of solution} = K \times Ah$$

The Amperhours are the total of the amperhours of the rectifiers.

Each different chemical 1, 2, 3, etc. will have a different value of K (K1, K2, K3 etc).

The relation between total Amperhours (Ah) and the surface unit (m²) is the following:

$$Ah = f \times m^2,$$

which means $i \times t = f \times m^2$

where i = current, t = time and f = constant which depends on oxide thickness, current density and anodizing time.



Considering the average oxide thickness, average anodizing time and average current density used, we have that f has a constant value and we can calculate $m^2 = Ah/f$

From total Amperhours shown in the dedicated PC (totalizer of all amperhours of all anodizing rectifiers) we get m^2 (square meter) and from the product consumption table (g/m^2 or l/m^2) the dosing pump will be able to supply the necessary amount of chemicals for each load. If one tank in the anodizing line requires more than one chemical, for example "n" chemicals, "n" dosing pumps connected to the PC and driven by total Amperhour signal will dose each chemical tank.

B) Liquid products for "electrical" tanks

The electrical tanks are the anodizing tanks, the modification tank for Multicolour and the electrocolouring tank.

Each electrical tank is chemically fed by one or "n" chemicals, so it is connected to one or "n" dosing pumps connected to the PC and driven by the Amperhour signal related to the particular rectifier dedicated to the specific anodizing tank.

ADVANTAGES

- The automatic dosing system described

above is quite reliable since, after a few days/weeks of "monitoring", comparing every day the chemical concentration by an accurate chemical analysis, it is possible to fine tune the dosing pumps by correcting the "k" and "f" factors which may vary from plant to plant and on local working conditions.

- The chemical concentration of the different chemicals will be completely constant after this fine tuning. The chemical laboratory analysis will not be necessary for concentration corrections, but only for double checking purposes.
- A further important advantage of the Italtecno automatic chemical dosing (ACD) is that the chemicals are added to the tanks continuously and slowly, so that the whole system (conductivity, pH, etc.) is always in ideal conditions while, with manual dosing it can vary from morning to evening or from Monday to Saturday, creating problems of non consistent quality (problems of etching and different appearance, quality of anodic coating, colour variation, quality of sealing).
- The supply of the ACD system also includes a daily service of tele-assistance online via modem which gives the customers the guarantee of daily supervision.

