Blowers for the Plating Process

Electroplating is a process that uses electrical current to "reduce" dissolved metal cations so that they form a coherent metal coating on an electrode. Electroplating is primarily used to change the surface properties of an object (e.g. abrasion and wear resistance, corrosion protection, etc.), but may also be used to build up the thickness of undersized parts or to form objects by electroforming.

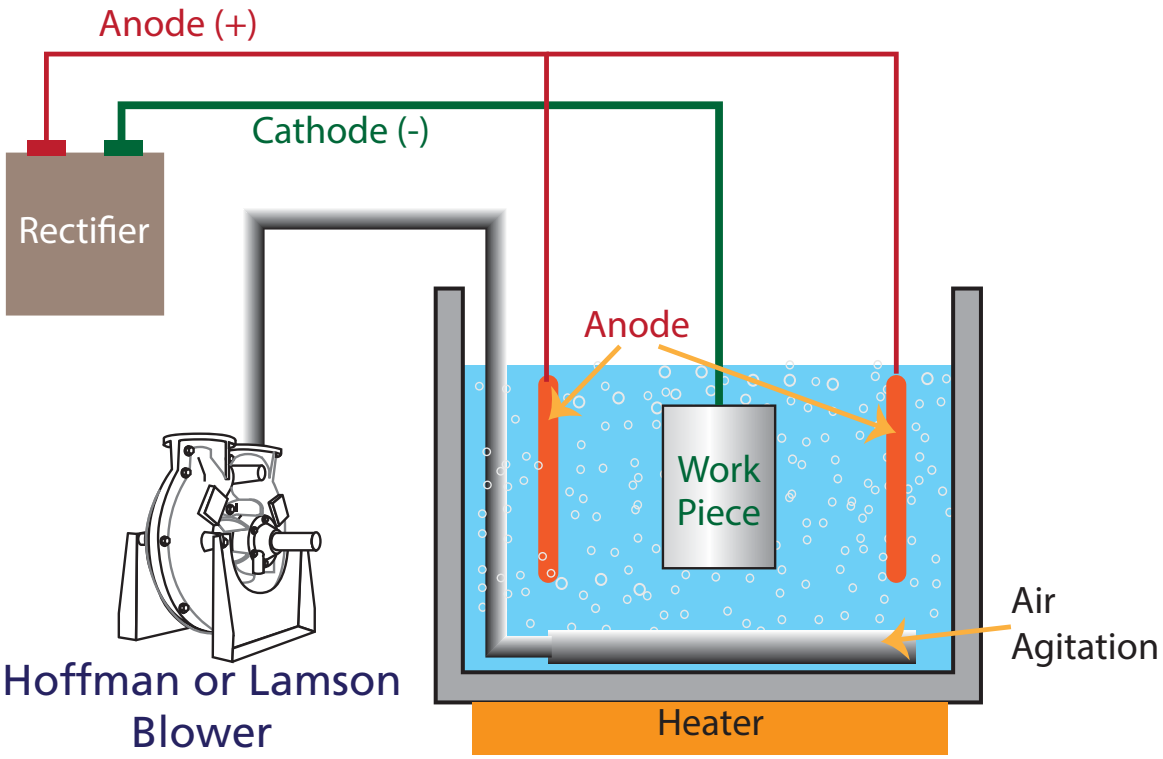
How Electroplating Is Done

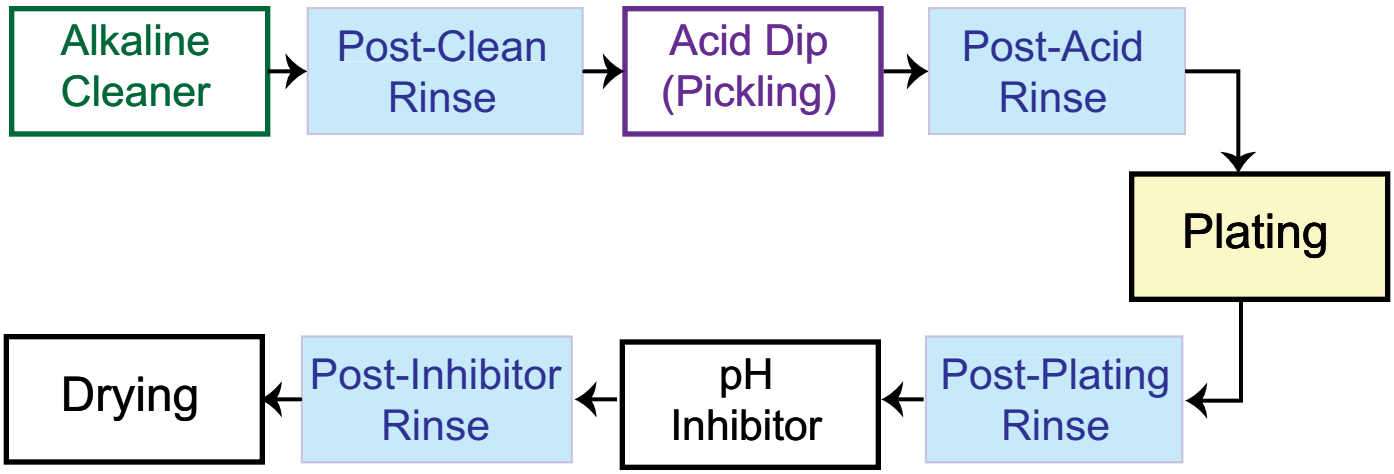
A tank is filled with a solution containing the salt of the metal that is to form the coating. For example, if it will be a copper coating, the solution, called the electrolytic bath, will consist of copper sulfate and water. The object to be plated, the workpiece, is immersed in the bath along with a metal bar, composed of either the metal that is to form the coating or a metal that is not affected by the electrolytic bath. The entire apparatus is called an electrolytic cell.

The workpiece is connected to the negative terminal of a direct current source and becomes the cathode (the electrode through which negative charge enters an electrical device). The metal bar is connected to the positive terminal of the power source and becomes the anode (where the negative charge leaves).

When electric power is applied, electrolysis begins. The bath gives up its metal content to the surface of the workpiece (the cathode). This coating forms an alloy with the metal of the workpiece, and adheres to it after it has been removed from the bath. As the electroplating process continues, the metal salts in the bath are used up. If the anode is a bar of the coating metal, the bar dissolves in the bath as its metal is used for coating. If the anode is made of another metal, salts of the coating metal must be added to the bath as metal becomes deposited on the workpieces.

The longer the process continues, the greater the thickness of the coating. If the workpiece and the metal with which it is to be coated will not combine into an alloy, the workpiece is first plated with a metal that will form an alloy with it. The plated workpiece is then plated with the desired metal. For example, steel to be silver-plated is first plated with copper, because steel and silver will not form an alloy.





Air Agitation

Air agitation was developed as an easy, effective and low maintenance solution to the plating problems of stratification and polarization.

- **Stratification**, in this application, refers to the separation of chemicals in solution. Once stratification begins, plating becomes uneven and uncontrolled.
- **Polarization** is the increase in electrode resistance due to the chemical reactions. It causes a drastic slowdown of the electrolytic reaction needed to produce the metal finishing process. Decreasing polarization increases the plating speed.

How Agitation Works

An air sparger is placed on the bottom of the tank along the front tank rim. This causes a rolling motion in the bath and allows tank sludge and other debris to collect along the opposite bottom, which helps prevent pitting.

The blower's pressure is based upon the depth of the bath. A valve, set low enough to avoid splashing and unneeded spray, is used to control the air flow rate. Fine diffused bubbles work best as they disperse to a greater surface area than large bubbles. This results in higher plating speeds and finer grain finishes.

Air agitation is generally used for rack plating where there is normally no possibility of parts being damaged since a rack holds the workpieces. It is almost never used for barrel plating where agitation causes the parts to scratch, rub and hit each other.

It is extremely important that some type of oil filter/separator be placed after the blower so that NO OILS pass through with the air into the plating solutions!!!

Rinsing

After the galvanizing process, there can also be a post-galvanizing surface treatment, e.g. in steel plating. This is followed by rinsing the workpiece in hot or cold water. The remaining water can be removed from the surface using a ringer roll or an air blower.

Rinsing efficiency can be optimized by finding the best amount of contact time and the correct level of agitation. Rinses that are agitated reduce the required amount of contact time. The air bubbles remove process chemicals from the workpiece's surface, so they remain in the tank. This, in turn, leads to reduced water fees, sewer fees, chemical costs and sludge generation.

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