Metal Plating Safety Meeting Kit

What’s At Stake

Guide to Metal Plating

The metal plating process involves creating an outer coating of nickel, copper, chromium or other metal to inhibit corrosion or to enhance the appearance of the parent metal. It is usually done by immersing the metal in an acid solution with an anode electric current and cathode. The material to be plated is made by the cathode (negative electrode) of an electrolysis cell through which a direct electric current is passed. The solution or bath contains the required metal in an oxidized form (either as a complex ion or equated cation). The anode is usually a bar of the metal being plated. During the electrolysis process, the metal is deposited on the work and the metal from the bar dissolves.

APPLICATIONS OF METAL PLATING

1. Surface Protection (also called anodic coatings or sacrificial coatings): to protect the base metal, primarily used over iron and steel.
2. Decorative Coatings: these make the metal more attractive and provides some level of protection.
3. Engineering coatings: used to impart a specific property to a surface. Examples include surfaces to increase solderability, conductivity, reflectivity and others.
4. Minor Metal Plating: limited number of metals that do not have many applications.
5. Unusual metals: metals that are electroplated under special conditions.
6. Alloy metal plating: also, for specialized applications.

What’s the Danger

HAZARDOUS SUBSTANCES PRESENT IN METAL PLATING WORK

- solvents such as methylene chloride, phenol, cresylic acid (a chemical similar to phenol).
- gases such as hydrogen cyanide.
- acids such as chromic and dichromic acid, sulphuric acid and hydrochloric acid.
- alkalis such as sodium hydroxide (also known as caustic soda).
- cyanides such as sodium and potassium cyanide.
- heavy metals such as nickel, chromates and dichromats, chromium, cadmium and lead.

WORKER HEALTH EXPOSURE IN THE METAL PLATING

- Short term health problems such as throat, lung, sinus, skin and eye irritation and burns.
- Long term health problems such as asthma, skin, heart, lung, and nerve disorders and cancer.
- The risk of developing health effects depends on how much chemical is absorbed into the body.
- The various nickel-based fumes and dust from plating are carcinogenic when inhaled, absorbed or ingested.
- Hydrochloric acids, sulfuric acids and other solutions used in the chemical reactions of plating lead to respiratory problems.

CAUSES OF CHEMICAL EXPOSURE TO WORKERS IN METAL PLATING

- containers leak or spill during transport, storage, decanting or disposal.
- explosive or toxic gas or fumes build up during storage in confined or poorly ventilated areas.
- operators are splashed by items being lifted in or out of plating tanks.
- excessive bubbling or fuming occurs in acids, caustic or other chemicals.
- dust is breathed in during buffing or grinding of plated items.
- excessive hydrogen or oxygen is emitted during electrolysis or anodising, causing an explosive.
- local exhaust ventilation fails, or is inadequate to handle escaping gases, fumes and mists.
- overhead gantry cranes, hooks or slings fail when lowering or lifting items from dip tanks.
- residue liquid and sludge is removed from dip tanks.
- poor housekeeping causes skin contact with plating solutions.
- chemical wastes are disposed of in sewers before being properly neutralised.
- chemical wastes are disposed of at tipping sites without approval and procedures.

BEST METAL PLATING SAFETY PROCEDURES AND PRACTICES

Proper Metal Plating PPE. To protect your skin, wear long sleeves and pants under chemical-resistant coveralls, gauntlets, and/or an apron. Wear heat and chemical-resistant gloves when using chemicals or handling plating objects. Choose rubber or leather safety shoes or boots with non-slip soles. Do not tuck your pants into your boots. Wear safety goggles and/or a face shield to protect your eyes from chemical splashes, dust, and flying particles. To protect your lungs, wear the correct respirator and filter cartridges.

Inspect/Maintain Work Area. Inspect and maintain your work area. Check electrical equipment and cords and tag damaged items out-of-service to prevent electric shock. Use good ventilation and dust collection to prevent fume and dust buildup, fire, and explosions. Use proper handling and storage of chemicals. Practice good housekeeping and clean up spills to prevent slips, trips, and falls.

General Precautions. Do not get caught and crushed by moving machinery such as hoists and conveyors. Use lockout/tagout procedures during maintenance and clearing jams. Wear sturdy work gloves to prevent cuts, punctures, and scrapes from sharp tools, sheet metal edges, and jagged metal deposits on product jigs and equipment. Protect yourself from materials hoisted overhead with a hard hat and by prohibiting transport over workers.

FINAL WORD

Metal plating provides many benefits to products made from metal and other materials. It is a surface covering process by which a metal is deposited on a conductive surface. Plating has been done for hundreds of years; it is also critical for modern technology.