

# Metal Finishers

*The metal-finishing industry includes electroplating, solution plating, and anodizing, but also printed circuit (wire) board and plastic plating. Chrome, zinc, copper, tin, nickel, gold, and silver are among the more common metals plated onto objects. In some processes objects are plated with two layers of metals, such as an under layer of copper followed by chrome. One common process in this industry is for the parts to be plated to be moved sequentially from a treatment tank to a rinse or wash tank, then to another treatment tank and to another rinse tank, until the desired number of plating steps has been accomplished. Water is used for the following process purposes: chemical and plating solution make-up, rinsing, fume-hood scrubbing, and equipment cleaning.*

## **Special Purposes**

In the metal-plating industry, water-savings measures often have multiple benefits, including reducing water and wastewater costs, reducing pretreatment costs, reducing energy costs, reducing chemical cost, increasing chemical- and metals-recovery rates, and reducing pollution emissions.

Effective water-efficiency measures include the following:

- ◆ meter make-up water in all new facilities.
- ◆ plumb facilities for countercurrent rinsing.
- ◆ use conductivity controllers for rinse tanks.
- ◆ install automatic shutoff valves on all hoses.
- ◆ recirculate water and/or use waste streams as make-up water for fume scrubbers.
- ◆ employ good tank design.
- ◆ mix or air-agitate tank contents.
- ◆ use multiple drag-out reduction methods.
- ◆ use filtration and water-treatment equipment where applicable.
- ◆ employ reactive rinsing.

## **Cooling Systems**

Use energy-efficient equipment to reduce waste heat, which might otherwise require larger water technologies such as cooling towers.

Air cooling is more water efficient than recirculating cooling-water systems. Avoid once-through cooling with potable water. **FOOD**

**Water saving measures can positively influence wastewater, pretreatment, energy, and chemicals costs, all the while increasing chemicals and metals recovery rates and reducing pollution emissions.**



## Heating Systems

Steam boilers and hot-water boilers provide heat and hot water for many purposes. Closed-loop systems return water and steam condensate to the boiler for reuse, saving energy and water. Open-loop systems expend the water or steam without return to the boiler.

Several water-efficiency choices are available:

- ◆ steam boilers of 200 boiler horsepower (hp) or greater, equipped with conductivity controllers to regulate top blowdown.
- ◆ for closed-loop systems, condensate-return meters on steam boilers of 200 boiler hp or greater.
- ◆ closed-loop steam systems operating at twenty cycles of concentration or greater (5 percent or less of makeup water) where chemistry of the water allows.
- ◆ steam-distribution lines and equipment with steam traps meeting all codes.
- ◆ make-up meters on feed-water lines:
  - » to steam boilers and water boilers of more than 100,000 Btus per hour.
  - » to closed-loop hot-water systems for heating.
- ◆ boiler-temperature and make-up meters that are clearly visible to operators.
- ◆ discharge pipes that are easy to inspect for flow and visible indicators that will indicate whether the valve has activated, thereby reducing plumbing leaks due to repeated openings of water-temperature- and pressure-relief valves (TPRVs). **REST, THERM**

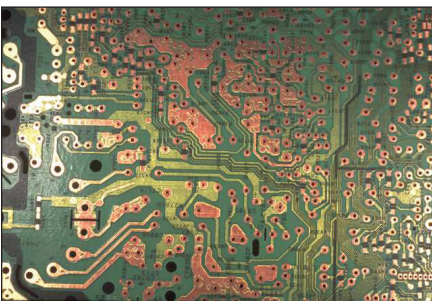
**Recirculate water and use waste streams as make-up water for fume scrubbers.**

## Water Treatment

Use water treatment only if and when necessary. **TREAT**

Measures to improve water efficiency in water treatment include:

- ◆ for all filtration processes, installing pressure gauges to determine when to backwash or change cartridges, followed by backwash based upon pressure differential.
- ◆ for all ion-exchange and softening processes, setting recharge cycles by volume of water treated or using conductivity controllers.
- ◆ avoiding the use of timers for softener-recharge systems.
- ◆ using water treatment only when necessary.
- ◆ use a reverse osmosis and nanofiltration systems with the lowest reject rate for its size.



- ◆ choose distillation equipment that recovers at least 85 percent of the feed water. **TREAT**

### *Plumbing*

Use high-efficiency toilets requiring no more than 1.3 gallons per flush and urinals which flush with 1 gallon or less. Avoid automatically timed flushing systems. Use self-closing faucets with flows of 0.5 gpm for hand washing. If available, and if codes and health departments permit, flush with non-potable water. **REST**

### *Floor Cleaning*

Employ these floor-cleaning efficiency practices:

- ◆ use low-flow, high-pressure nozzles on hoses or water brooms for floor and mat washing where a flow of water is needed. **REST, FOOD, PROC**
- ◆ minimize the need to use a hose as a broom by installing drains close to areas where liquid discharges are expected. **PROC**

### *Other*

Install automatic-shutoff and solenoid valves on all hoses and water-using equipment. **PROC**

Install faucets on set tubs and janitorial sinks with flows not to exceed 2.2 gpm. **REST**

If water features or irrigated landscaping is on the site, refer to the summary: “**Water Features, Pools, and Landscapes.**”

TIP: Conspicuously mark fire-protection plumbing so no connections will be made except for fire protection. Additionally, install flow-detection meters on fire services to indicate unauthorized water flows. **REST**



**Commonly, parts to be plated are moved sequentially from one tank to another through a series of processes — treating, washing, rinsing — with multiple iterations.**