

# Electroplating Using Cyanide in a Plating Bath Operating at a pH of Greater Than or Equal to 12 and Containing One or More of the Plating and Polishing Metal HAP

*Cadmium, Chromium, Lead, Manganese, and Nickel*  
*Generally Available Control Technology (GACT)*  
73 FR 37741, July 1, 2008; as amended at 76 FR 57919, Sept. 19, 2011  
<http://ecfr.gpoaccess.gov/>

## **Requirements**

The requirement of this operation is as follows:

- Measure and record the pH of the tank upon start-up.

No additional pH measurements are required.

## **Management practices**

1. Minimize bath agitation when removing parts except as necessary to meet part quality requirements.
2. Maximize drip time when removing parts using drain boards and drip shields or withdrawing parts slowly.
3. Minimize the drag-out of bath solution through the design of barrels, racks, and parts such as slotted barrels, tilted racks, and flow-through holes.
4. Use tank covers if available.
5. Minimize tank heating without adversely affecting production or part quality.
6. Repair and maintain racks, barrels, and other equipment.
7. Minimize bath contamination.
  - a. Preventing or quickly recovering dropped parts
  - b. Utilization of distilled/de-ionized water
  - c. Water filtration
  - d. Pre-cleaning parts to be plated
  - e. Thorough rinsing of pretreated parts to be plated
8. Maintain bath chemistry through process control.
9. Perform good housekeeping including sweeping, vacuuming, and periodic wash-downs as necessary.
10. Minimize spills and tank overflows.
11. Use squeegee rolls in continuous or reel-to-reel plating tanks.
12. Conduct leak detection inspections.
13. Identify opportunities for pollution prevention.

## **Exclusions from this Regulation**

This regulation exempts the following operations:

- Hard and decorative chromium electroplating
- Chromium anodizing
- Plating and polishing conducted for:

- Research and development
- Education
- Repair of surfaces or equipment
- Restoration of the original finish
- Dry mechanical polishing prior to plating
- Trace quantities of any one of the five (5) metals

### **Applicable Definitions**

**Cyanide plating** means plating processes performed in tanks using cyanide as a major bath ingredient and operating at pH of 12 or more, and use or emit any of the plating and polishing metal HAP. Electroplating and electroforming are performed with or without cyanide. The cyanide in the bath works to dissolve the HAP metal added as a cyanide compound (e.g., cadmium cyanide) and creates free cyanide in solution helping to corrode the anode. These tanks are self regulating to a pH of 12 due to the caustic nature of the cyanide bath chemistry. The cyanide in the bath is a major bath constituent and not an additive. However, the self-regulating chemistry of the bath causes the bath to act as if wetting agents/fume suppressants are being used and to ensure an optimum plating process. All cyanide plating baths at pH greater than or equal to 12 have cyanide-metal complexes in solution. The metal HAP to be plated is not emitted because it is either bound in the metal-cyanide complex or reduced at the cathode to elemental metal, and plated onto the immersed parts. Cyanide baths are not intentionally operated at pH less 12 since unfavorable plating conditions would occur in the tank, among other negative effects.