

Plating and Polishing Regulatory Summary

40 CFR 63, Subpart WWWW, National Emission Standards for Hazardous Air Pollutants
73 FR 37741, July 1, 2008; as amended at 76 FR 57919, Sept. 19, 2011
<http://ecfr.gpoaccess.gov/>

What does it affect?

This regulation affects emissions of Cadmium, Chromium, Lead, Manganese, and/or Nickel from any of the following operations:

- Cadmium, lead, nickel, or tin/lead electroplating
- Electroless nickel plating*
- Electroplating
- Electroforming
- Electropolishing
- Chromate conversion coating*
- Manganese phosphating*
- Nickel acetate sealing*
- Sodium dichromate sealing*
- Thermal metal spraying
- Dry mechanical polishing after plating

* Subject only to applicable management practices, as practicable, as well as reporting and recordkeeping.

What is exempt 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

Please note a business is exempt from this regulation if it has been determined to be a major source of hazardous air pollutants (HAP).

What are the reports and records requirements?

All reports and records must be maintained for a minimum of **five (5) years**. The U.S. EPA and IDEM should receive copies of required submittals as follows:

- The **Initial Notification** should be submitted upon **start-up** of the operation. This notification should include:
 - Name and address of the owner or operator
 - Description of the nature, size, design, and method of operation
 - Relevant/applicable parts of the regulation

- Description of compliance methods
- The **Notification of Compliance Status (NCS)** should be submitted prior to or upon start-up of the operation and/or within 30 days of a change to the operation. This notification should include information regarding:
 - Materials
 - Methods
 - Common practices
 - Control measures and on-going compliance

A facility must:

- State the applicable management practices have been implemented, as practical
- State the manufacturer's specifications as well as operating and maintenance instructions for each device and/or control practice is followed. The items should be easily accessible to the operator.

- The **Annual Compliance Certification (ACC)** should be prepared no later than **January 31st** of the following year and submitted if a deviation has occurred.

A deviation is a failure to meet any requirement, condition, and/or standard required by this regulation. The report should include:

- A description of the deviation
- Corrective actions taken

A facility must:

- State the applicable management practices have been implemented, as practical
- State the manufacturer's specifications have been followed and the control devices utilized have been properly operated and maintained.

Are there specific reporting requirements for the different specific operations?

There are specific requirements regarding the NCS and ACC depending on the type of operation. The following are additional requirements for consideration.

- **Non-cyanide electroplating, electroforming, or electropolishing tank:**

- *If a wetting agent/fume suppressant is utilized:*

NCS: A facility must state a wetting agent/fume suppressant is added to the tank bath.

ACC: A facility must:

- State a wetting agent/fume suppressant is added to the tank bath.
- Record the addition of a wetting agent/fume suppressant to the tank bath in the original make-up of the tank. If the wetting agent/fume suppressant is a separate ingredient record each addition of wetting agent/fume suppressant to replenish the tank bath.

- *If a control system is utilized:*

NCS: A facility must state the installation of a composite mesh pad, packed bed scrubber, or mesh pad mist eliminator has been achieved.

ACC: A facility must state:

- The manufacturer's specifications have been followed and the control devices utilized have been properly operated and maintained.
- Record the results of all control system inspections, deviations from proper operation, and any corrective action taken.

- *If a tank cover is utilized :*

NCS and ACC: A facility must state the tank is operated with the cover in place at least 95 percent of the electrolytic process operating time.

- *If a continuous electrolytic process tank is operated:*

NCS: A facility must state:

- At least 75 percent of the surface area of the tank is covered.
- The tank is operated with the surface cover in place whenever the continuous electrolytic process is occurring.

ACC: A facility must state 75 percent of the tank is covered during all periods of electrolytic process operation.

- **Flash or short-term electroplating tank:**

NCS: A facility must state the operating time is limited to one (1) hour per day or three (3) minutes per hour

Or

The tank is operated with the cover in place at least 95 percent of the operating time.

ACC: A facility must state the operating time is limited to one (1) hour per day or three (3) minutes per hour. The operating time must be recorded.

Or

The tank is operated with the cover in place at least 95 percent of operating time. The operating time must be recorded and note when the cover was utilized.

- *If the operation utilizes cyanide:*

NCS: A facility must report the pH of the bath solution measured at startup.

- **Dry mechanical polishing [after plating and without use of pastes, liquids or lubricants]:**

NCS: A facility must state a cartridge, fabric or HEPA filter has been installed.

- **Thermal spraying:**

- *If the unit was constructed or reconstructed on or before March 14, 2008:*

NCS: A facility must notify the utilization of a water curtain to capture overspray from this operation, when applicable otherwise a facility must state a cartridge, fabric, or HEPA filter has been installed.

Please note, overspray from thermal spraying that lasts no more than an hour per day outside a spray booth is not required to be controlled by a cartridge, fabric, or HEPA filter. It is considered temporary thermal spraying.

Applicable Definitions

Batch electrolytic process tank means a tank utilized for an electrolytic process in which a part or group of parts, typically mounted on racks or placed in barrels, is placed in the tank and immersed in an electrolytic process solution as a single unit (i.e., as a batch) for a predetermined period of time, during which none of the parts are removed from the tank and no other parts are added to the tank, and after which the part or parts are removed from the tank as a unit.

Bath means the liquid contents of a tank utilized for electroplating, electroforming, electropolishing, or other metal coating processes at a plating and polishing facility.

Bench-scale means any operation small enough to be performed on a bench, table, or similar structure so the equipment is not directly contacting the floor.

Capture system means the collection of components used to capture gases and fumes released from one (1) or more emissions points and then convey the captured gas stream to a control device, as part of a complete control system. A capture system may include, but is not limited to, the following components as applicable to a given capture system design: duct intake devices, hoods, enclosures, ductwork, dampers, manifolds, plenums, and fans.

Cartridge filter means a type of control device utilizing perforated metal cartridges containing a pleated paper or non-woven fibrous filter media to remove particulate matter (PM) from a gas stream by sieving and other mechanisms. Cartridge filters can be designed with single use cartridges which are removed and disposed after reaching capacity, or continuous use cartridges which typically are cleaned by means of a pulse-jet mechanism.

Composite mesh pad means a type of control device similar to a mesh pad mist eliminator except the device is designed with multiple pads in series that are woven with layers of material with varying fiber diameters, which produce a coalescing effect on the droplets or PM impinging upon the pads.

Continuous electrolytic process tank means a tank utilizing an electrolytic process in which a continuous metal strip or other type of continuous substrate is fed into and removed continuously from the tank. This process is also called *reel-to-reel electrolytic plating*.

Control device means equipment that is part of a control system collecting and/or reducing the quantity of a pollutant emitted to the air. The control device receives emissions transported from the process by the capture system.

Control system means the combination of a capture system and a control device. The capture system is designed to collect and transport air emissions from the affected source to the control device. The overall control efficiency of any control system is a combination of the ability of the system to capture the air emissions (*i.e.*, the capture efficiency) and the control device efficiency. Consequently, it is important to achieve good capture to ensure good overall control efficiency. Capture devices known to provide high capture efficiencies include hoods, enclosures, or any other duct intake devices with ductwork, dampers, manifolds, plenums, or fans.

Conversion coatings are coatings forming a hard metal finish on an object when the object is submerged in a tank bath or solution containing the conversion coatings. Conversion coatings for the purposes of this rule include coatings composed of chromium, as well as the other plating and polishing metal HAP, where no electrical current is used.

Cyanide plating means plating processes performed in tanks using cyanide as a major bath ingredient, operating at a pH of 12 or more, and use or emit any of the plating and polishing metal HAP.

Electroplating and electroforming can be 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, which helps 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.

All cyanide plating baths at a 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.

Deviation means any instance in which an affected source or an owner or operator of such an affected source:

- (1) Fails to meet any requirement or obligation established by this rule including, but not limited to, any equipment standard (including emissions and operating limits), management practice, or operation and maintenance requirement.

(2) Fails to meet any term or condition adopted to implement an applicable requirement in this rule and is included in the operating permit for any affected facility required to obtain such a permit.

(3) Fails to meet any equipment standard (including emission and operating limits), management standard, or operation and maintenance requirement in this rule during startup, shutdown, or malfunction.

Dry mechanical polishing means a process used for removing defects from and smoothing the surface of finished metals and formed products after plating or thermal spraying with any of the plating and polishing metal HAP using automatic or manually-operated machines having hard-faced abrasive wheels or belts and where no liquids or fluids are used to trap the removed metal particles. The affected process does not include polishing with use of pastes, liquids, lubricants, or any other added materials.

Electroforming means an electrolytic process using or emitting any of the plating and polishing metal HAP used for fabricating metal parts. This process is essentially the same as electroplating except the plated substrate (mandrel) is removed leaving only the metal plate. In electroforming, the metal plate is self-supporting and generally thicker than in electroplating.

Electroless plating means a non-electrolytic process using or emitting any of the plating and polishing metal HAP in which metallic ions in a plating bath or solution are reduced to form a metal coating at the surface of a catalytic substrate without the use of external electrical energy.

Electroless plating is also called non-electrolytic plating. Examples include, but are not limited to chromate conversion coating, nickel acetate sealing, sodium dichromate sealing, and manganese phosphate coating.

Electrolytic plating processes means electroplating and electroforming operations using or emitting any of the plating and polishing metal HAP where metallic ions in a plating bath or solution are reduced to form a metal coating on the surface of parts and products using electrical energy.

Electroplating means an electrolytic process using or emitting any of the plating and polishing metal HAP in which metal ions in solution are reduced onto the surface of the work piece (the cathode) via an electrical current.

The metal ions in the solution are usually replenished by the dissolution of metal from solid metal anodes fabricated of the same metal being plated or by direct replenishment of the solution with metal salts or oxides. Electroplating is also called electrolytic plating.

Electropolishing means an electrolytic process using or emitting any of the plating and polishing metal HAP in which a work piece is attached to an anode immersed in a bath, and the metal substrate is dissolved electrolytically, thereby removing the surface contaminant. Electropolishing is also called electrolytic polishing.

Fabric filter means a type of control device used for collecting particulate matter (PM) by filtering a process exhaust stream through a filter or filter media. A fabric filter is also known as a baghouse.

Filters, for the purposes of this rule, include cartridge, fabric, or HEPA filters, as defined in this section.

Flash electroplating means an electrolytic process performed in a tank that using or emitting any of the plating and polishing metal HAP and using no more than three (3) cumulative minutes per hour or no more than one (1) cumulative hour per day.

General Provisions of this part (40 CFR part 63, subpart A) means the section of the Code of Federal Regulations (CFR) addressing air pollution rules that apply to all HAP sources addressed in part 63, which includes the National Emission Standards for Hazardous Air Pollutants (NESHAP).

HAP means hazardous air pollutant as defined from the list of 188 chemicals and compounds specified in the Clean Air Act (CAA) Amendments of 1990. HAP are also referred to as “air toxics.” The five (5) plating and polishing metal HAP, as defined in this section, are on this list of 188 chemicals.

High efficiency particulate air (HEPA) filter means a type of control device using a filter composed of a mat of randomly arranged fibers and is designed to remove at least 99.97 percent of airborne particles that are 0.3 micrometers or larger in diameter.

Maintenance is performed to keep the process equipment or the facility operating properly and is not performed on items to be sold as products.

A major facility for HAP is any facility emitting greater than 10 tpy of any HAP, or emitting a combined total of all HAP of over 25 tpy throughout the facility.

Mesh pad mist eliminator means a type of control device, consisting of layers of interlocked filaments densely packed between two (2) supporting grids that remove liquid droplets and PM from the gas stream through inertial impaction and direct interception.

Metal coating operation means any process performed either in a tank containing liquids or as part of a thermal spraying operation applying one or more plating and polishing metal HAP, to the surface of parts and products used in manufacturing. These processes include but are not limited to, non-chromium electroplating; electroforming; electropolishing; non-electrolytic metal coating processes, such as chromate conversion coating, electroless nickel plating, nickel acetate sealing, sodium dichromate sealing, and manganese phosphate coating; and thermal or flame spraying.

Metal HAP content of material used in plating and polishing is the HAP content as determined from an analysis or engineering estimate of the HAP contents of the tank bath or solution, in the case of plating, metal coating, or electropolishing; or the HAP content of the metal coating being applied in the case of thermal spraying. Safety data sheet (SDS) information may be used in-lieu of testing or engineering estimates but is not required to be used.

New source means any affected source for which you commenced construction or reconstruction after March 14, 2008.

Non-cyanide electrolytic plating and electropolishing processes means electroplating, electroforming, and electropolishing using or emitting any of the plating and polishing metal HAP performed without cyanide in the tank. These processes do not use cyanide in the tank and operate at pH values less than 12. These processes use electricity and add or remove metals such as metal HAP from parts and products used in manufacturing. Both electroplating and electroforming can be performed with cyanide as well.

Non-electrolytic plating means a process using or emitting any of the plating and polishing metal HAP in which metallic ions in a plating bath or solution are reduced to form a metal coating at the surface of a catalytic substrate without the use of external electrical energy. Non-electrolytic plating is also called electroless plating.

Examples include chromate conversion coating, nickel acetate sealing, electroless nickel plating, sodium dichromate sealing, and manganese phosphate coating.

Packed-bed scrubber means a type of control device including a single or double packed bed containing packing media on which PM and droplets impinge and are removed from the gas stream. The packed-bed section of the scrubber is followed by a mist eliminator to remove any water entrained from the packed-bed section.

Plating and polishing facility means a facility engaged in one (1) or more of the following processes using or emitting any of the plating and polishing metal HAP: electroplating processes other than chromium electroplating (*i.e.*, nonchromium electroplating); electroless plating; other non-electrolytic metal coating processes performed in a tank, such as chromate conversion coating, nickel acetate sealing, sodium dichromate sealing, and manganese phosphate coating; thermal spraying; and the dry mechanical polishing of finished metals and formed products after plating or thermal spraying.

Plating is performed in a tank or thermally sprayed so a metal coating is irreversibly applied to an object.

Plating and polishing does not include any bench-scale processes.

Plating and polishing metal HAP means any compound of any of the following metals cadmium, chromium, lead, manganese, and nickel, or any of these metals in the elemental form, with the exception of lead.

Any material not containing cadmium, chromium, lead, or nickel in amounts greater than or equal to 0.1 percent by weight (as the metal), and does not contain manganese in amounts greater than or equal to 1.0 percent by weight (as the metal), as reported on the Safety Data Sheet (SDS) for the material, is not considered to be a plating and polishing metal HAP.

Plating and polishing process tanks means any tank in which a process is performed at an affected plating and polishing facility using or has the potential to emit any of the plating and polishing metal HAP.

The processes performed in plating and polishing tanks include the following electroplating processes other than chromium electroplating (*i.e.*, non-chromium electroplating) performed in a tank; electroless plating; and non-electrolytic metal coating processes, such as chromate conversion coating, nickel acetate sealing, sodium dichromate sealing, and manganese phosphate coating; and electropolishing.

This term does not include tanks containing solutions used to clean, rinse, or wash parts prior to placing the parts in a plating and polishing process tank, or subsequent to removing the parts from a plating and polishing process tank. This term also does not include any bench-scale operations.

PM means solid or particulate matter that is emitted into the air.

Research and development process unit means any process unit used for conducting research and development for new processes and products and is not used to manufacture products for commercial sale, except in a *de minimis* manner.

Repair means any process used to return a finished object or tool back to its original function or shape.

Short-term plating means an electroplating process using or emitting any of the plating and polishing metal HAP and used no more than three (3) cumulative minutes per hour or one (1) hour cumulative per day.

Startup of the tank bath is when the components or relative proportions of the various components in the bath have been altered from the most recent operating period. Startup of the bath does not include events where only the tank's heating or agitation and other mechanical operations are turned back on after being turned off for a period of time.

Tank cover for batch process units means a solid structure made of an impervious material designed to cover the entire open surface of a tank or process unit that is used for plating or other metal coating processes.

Tank cover for continuous process units means a solid structure or combination of structures, made of an impervious material designed to cover at least 75 percent of the open surface of the tank or process unit that is used for continuous plating or other continuous metal coating processes.

Temporary thermal spraying means a thermal spraying operation using or emitting any of the plating and polishing metal HAP and that lasts no more than one (1) hour in duration during any one (1) day and is conducted in situ. Thermal spraying conducted in a dedicated thermal spray booth or structure is not considered to be temporary thermal spraying.

Thermal spraying (also referred to as metal spraying or flame spraying) is a process using or emitting any of the plating and polishing metal HAP in which a metallic coating is applied by projecting heated, molten, or semi-molten metal particles onto a substrate.

Commonly used thermal spraying methods include high velocity oxy-fuel (HVOF) spraying, flame spraying, electric arc spraying, plasma arc spraying, and detonation gun spraying. This operation does not include spray painting at ambient temperatures.

Water curtain means a type of control device drawing the exhaust stream through a continuous curtain of moving water to scrub out suspended PM.

Wetting agent/fume suppressant means any chemical agent reducing or suppressing fumes or mists from plating by reducing the surface tension of the tank bath.