Verification of Applicable Standards and Reporting Requirements for Electroplaters and Metal Finishers

Wastewater being discharged into publicly owned treatment works (POTWs)from the first six metal finishing operations[1] have been subject to federal electroplating (Part 413) pretreatment standards since either April 27 or June 30, 1984. Wastewaters from all forty-six metal finishing operations are now (as of February 15, 1986) regulated by the more stringent federal metal finishing (Part 433) pretreatment standards for existing or for new sources, unless the facilities generating these wastewaters fall into one of two specific categories, in which case they will remain subject only to Part 413 standards.

1 a. Does your facility perform any of the first six metal finishing operations?

YES _____ NO _____

If yes, go to 1 b. If no, have an authorized representative[2] of your facility sign and submit Certification A, then go to 10.

1 b. Does your facility discharge from any of the 46 metal finishing operations?

YES _____ NO _____

If yes, go to 2. If no, have an authorized representarive[2] of your facility sign and submit Certification E, then go to 10.

2. Did your facility begin operation before September 1, 1982?

YES _____ NO _____

If yes, please have an authorized representative of your facility sign and submit Certification B, then go to 3. If no, go to 6.

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[1]Throughout these instructions, metal finishing operations refers to the forty-six unit operations listed in Table 1. The first six metal finishing operations means operations 1-6 in Table 1.

[2]An authorized representative as a minimum shall be a vice president-level individual if your facility is a corporation; a general partner or proprietor if your facility is a partnership or sole proprietorship, respectively; or any other representative if that representative is responsible for your facility's operations.

3. Does your facility own, in a calendar year, less than 50% (area basis) of the materials which undergo those of the forty-six metal finishing operations which are performed at your facility?

YES NO

If yes, please have an authorized representative of your facility sign and submit Certification C, then go to 5. If no, go to 4.

4. Is your facility an independent printed circuit board manufacturer (does it manufacture printed circuit boards principally for sale to other companies)?

YES NO

If yes, please have an authorized representative of your facility sign and submit Certification D, then go to 5. If no, go to 6.

5. All wastewaters which your facility discharges from any of the first six metal finishing operations are subject to electroplating (Part 413) pretreatment standards. Has your facility submitted an electroplating 90-day compliance report?

YES NO

If yes, go to 8. If no, go to 7.

6. All wastewaters which your facility discharges from any of the forty-six metal finishing operations are subject to metal finishing (Part 433) pretreatment standards. Your facility must submit a metal finishing 90-day compliance report by May 15, 1986. Sampling results for each regulated pollutant, representative of the monthly discharge from your facilty, are required to complete the report. A minimum of one production week's worth of 24-hour composite sampling results for each regulated pollutant is recommended. The maximum daily value of each regulated pollutant is to be reported in the daily maximum column of Form G, and the average value of each regulated pollutant for all daily samples is to be reported in the maximum monthly average column. If you answered yes to question 2, complete the upper portion of Form G. If you answered no to question 2, complete the lower portion of Form G. Go to 9.

7. Submit an electroplating 90-day compliance report as soon as possible. The results of four consecutive 24-hour composite samples for each regulated pollutant are necessary to complete the report. The maximum daily value of each regulated pollutant is to be reported in the daily maximum column of Form G, and the average value of each regulated pollutant for the four daily samples is to be reported in the four-day average column. If your facility discharges

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less than 10,000 gallons per day of wastewater from the first 6 metal finishing operations, complete the upper portion of Form G. If your facility discharges 10,000 gallons or more per day of wastewater from the first six metal finishing operations, complete the lower portion of Form G. The electroplating (Part 413) TTO compliance date is not until July 15, 1986, so a TTO sampling result does not have to be submitted until October 15, 1986, but you may go ahead and submit one now and not have to do so later. Go to 8.

8. Four consecutive 24-hour composite samples must be taken and reported for all regulated pollutants every six months for continued compliance reporting. Go to 11.

9. Sampling results representative of your facility's monthly discharge, must be taken and reported for all regulated pollutants (except TTO, which may be certified for, provided the TTO sampling result in the 90-day compliance report shows compliance with the TTO standard and a toxic organic management plan has been submitted by your facility) every six months for continued compliance reporting. A minimum of one production week's worth of 24-hour composite samples is recommended. Go to 11.

10. Wastestreams from your facility are not regulated by electroplating (Part 413) or metal finishing (Part 433) pretreatment standards. Go to 11.

11. Verification of the applicable standards and reporting requirements for your facility is now complete. Please submit any and all reports and monitoring results requested.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS

Unit Operations	Summary Description of Unit Operations
1. Electroplating	The production of a thin surface coating of one metal upon another by electrodeposition. Ferrous or nonferrous basis materials may be coated by a variety of common (copper, nickel, lead, chromium, brass, bronze, zinc, tin, cadmium, iron, aluminum or combinations thereof) or precious (gold, silver, platinum, osmium, iridium, palladium, rhodium, indium, ruthenium, or combinations thereof) metals. In electroplating, metal ions supplied by the dissolution of metal from anodes or other pieces, are reduced on the work pieces (cathodes) while in either acid, alkaline, or neutral solutions.
2. Electroless Plating	The chemical deposition of a metal coating on a workpiece by immersion in an appropriate plating solution in which electricity is not involved. Copper and nickel electroless plating for printed circuit boards are the most common operations. Immersion plating, which for purposes of the Metal Finishing regulation is considered part of electroless plating, produces a metal deposit by chemical displacement.
3. Anodizing	An electrochemical process which converts the metal surface to a coating of an insoluble oxide. Aluminum is the most frequently anodized material. The formation of the oxide occurs when the parts are made anodic in dilute sulfuric or chromic acid solutions. The oxide layer begins formation at the extreme outer surface, and as the reaction proceeds, the oxide grows into the metal.
4. Coatings	Any operation that includes chromating, phosphating, metal coloring and passivating. In chromating, a portion of the base metal is converted to a component of the protective film formed by the coating solutions containing hexavalent chromium and active organic or inorganic compounds. Phosphate coatings are formed by the immersion of steel, iron, or zinc plated steel in a dilute solution of phosphoric acid plus other reagents to condition the surfaces for further processing. Metal coloring involves the chemical method of converting the metal surface into an

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
	oxide or similar metallic compound to produce a decorative finish. Passivating is the process of forming a protective film on metals by immersion in an acid solution, usually nitric acid or nitric acid with sodium dichromate.
5. Etching and Chemical Milling	These operations are used to produce specific design configurations or surface appearances on parts by controlled dissolution with chemical reagents or etchants. Chemical etching is the same process as chemical milling except the rates and depths of metal removal are usually much greater in chemical milling.
6. Printed Circuit Board Manufacturing	This operation involves the formation of a circuit pattern of conductive metal (usually copper) on nonconductive board materials such as plastic or glass. There are five basic steps involved in the manufacturing of printed circuit boards: cleaning and surface preparation, catalyst and electroless plating, pattern printing and masking, electroplating, and etching.
7. Cleaning	This operation involves the removal of oil, grease, and dirt from the basis material using water with or without detergents or other dispersing agents. Acid cleaning is a process in which an acid is used with a wetting agent or detergent to remove oil, grease, dirt, or oxide from the metal surface.
8. Machining	This operation involves the general process of removing stock from a workpiece by forcing a cutting tool through the workpiece, thereby removing a chip of basis material. Machining operations incorporate the use of natural and synthetic oils for cooling and lubrication.
9. Grinding	This operation involves the process of removing stock from a workpiece by the use of a tool consisting of abrasive grains held by a rigid or semi-rigid binder. Natural and synthetic oils are used for cooling and lubrication in many grinding operations.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
10. Polishing	This abrading operation is used to remove or smooth out surface defects (scratches, pits, tool marks, etc.) that adversely affect the appearance or function of a part. Area cleaning and washdown can produce wastes that enter wastewater streams. The wastes would belong to the common metals and oily waste types.
11. Barrel Finishing (or Tumbling)	This operation is a controlled method of processing parts to remove burrs, scale, flash, and oxides as well as to improve surface finish. Barrel finishing produces a uniformity of surface finish not possible by hand finishing and is generally the most economical method of cleaning and surface conditioning. Wastewater is generated by rinsing of parts following the finishing operation and by periodic dumping of process solutions. Contributions to the common metals, hexavalent chromium, cyanide, and oily waste types could be made by this operation, depending upon the chemical solutions employed.
12. Burnishing	This operation involves the process of finish sizing or smooth finishing a workpiece (previously machined or ground) by displacement, rather than removal, of minute surface irregularities. Wastes may come from spills, leaks, process solution dumps and post-finish rinsing and could contribute to the common metals, precious metals, and oily waste types depending upon the basis material finished. In addition, sodium cyanide (NaCN) may be used as a wetting agent and rust inhibitor (for steel), thus contributing cyanide wastes from this operation.
13. Impact Deformation	This operation involves the process of applying an impact force to a workpiece such that the workpiece is permanently deformed or shaped. Wastes containing common metals and oily wastes may come from cleaning the parts or cleanup of leaks or spills.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
14. Pressure Deformation	This operation involves the process of applying force (at a slower rate than at impact force) to permanently deform or shape a workpiece. Wastes containing common metals and oily wastes may come from cleaning the parts or cleanup of leaks or spills.
15. Shearing	This operation involves the process of severing or cutting a workpiece by forcing a sharp edge or opposed sharp edges into the workpiece stressing the material to the point of shear failure and separation. Wastes containing common metals and oily wastes may come from cleaning the parts or cleanup of leaks or spills.
16. Heat Treating	This operation involves the modification of the physical properties of a workpiece through the application of controlled heating and cooling cycles. Wastewater is generated through rinses, bath discharges, spills, and leaks, and often contain the solution constitutents as well as various scales, oxides, and oils.
17. Thermal Cutting	This operation involves the process of cutting, slotting or piercing a workpiece using an oxyacetylene oxygen lance or electric arc cutting tool. Water may be used for rinsing or cooling of parts and equipment following this operation. Wastewaters produced would contribute to the common metals and oily waste types.
18. Welding	This operation involves the process of joining two or more pieces of material by applying heat, pressure or both, with or without filler material, to produce a localized union through fusion or recrystallization across the interface. This operation is followed by quenching, cooling or annealing in a solution of water or emulsified oils. When this is done, wastes produced can belong to the common metals waste type.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
19. Brazing	This operation involves the process of joining metals by flowing a thin, capillary thickness layer of nonferrous filler metal into the space between them. Bonding results from the intimate contact produced by the dissolution of a small amount of base metal in the molten filler metal, without fusion of the base metal. The term brazing is used where the temperature exceeds 425°C (800°F). This operation is followed by quenching, cooling or annealing in a solution of water or emulsified oils. When this is done, wastes produced can belong to the common metals waste type.
20. Soldering	This operation involves the process of joining metals by flowing a thin (capillary thickness) layer of nonferrous filler metal into the space between them. Bonding results from the intimate contact produced by the dissolution of a small amount of base metal in the molten filler metal, without fusion of the base metal. The term soldering is used where the temperature range falls below 425°F (800°F). This operation is followed by quenching, cooling or annealing in a solution of water or emulsified oils. When this is done, wastes produced can belong to the common metals waste type.
21. Flame Spraying	This operation involves the process of applying a metallic coating to a workpiece using finely powdered fragments of wire, together with suitable fluxes, which are projected through a cone of flame onto the workpiece. This operation is followed by quenching, cooling or annealing in a solution of water or emulsified oils. When this is done, wastes produced can belong to the common metals waste type.
22. Sand Blasting	This operation involves the process of removing stock, including surface films, from a workpiece by the use of abrasive grains pneumatically impinged against the workpiece.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
23. Abrasive Jet Machining	This operation is a mechanical process for cutting hard brittle materials. It is similar to sand blasting but uses much finer abrasives carried at high velocities (500-3000 fps) by a liquid or gas stream. Wastewater can be produced through solution dumps, spills, leaks or washdowns of work areas and contributes to the common metals and oily waste types.
24. Electrical Discharge Machining	This operation is a process which can remove metal from any metal with good dimensional control. The machining action is caused by the formation of an electrical spark between an electrode, shaped to the required contour, and the workpiece. Rinsing of machined parts and work area cleanups can generate wastewaters which also contain base materials. These wastewaters contribute to the common metals and oily waste types.
25. Electrochemical Machining	This operation is a process based on the same principles used in electroplating except the workpiece is the anode and the tool is the cathode. Electrolyte is pumped between the electrodes and a potential applied which results in removal of the metal. In addition to standard chemical formulations, inorganic and organic solvents are sometimes used as electrolytes for electrochemical machining and with the basis material being machined, can enter waste steams via rinse discharges, bath dumps, and floor spills. Generated wastes can belong to the common metals, cyanide, and solvent waste types depending upon the solvent used.
26. Electron Beam Machining	This operation is a thermoelectric process whereby heat is generated by high velocity electrons impinging on part of the workpiece. At the point where the energy of the electrons is focused, it is transformed into sufficient thermal energy to vaporize the material locally and is generally carried out in a vacuum.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
27. Laser Beam Machining	This operation is the process whereby a highly focused monochromatic collimated beam of light is used to remove material at the point of impingement on a workpiece. Laser beam machining is a thermoelectric process with material removal largely accomplished by evaporation, although some material is removed in the liquid state at high velocity.
28. Plasma Arc Machining	This operation is the process of material removal or shaping of a workpiece by a high velocity jet of high temperature ionized gas. A gas (e.g., nitrogen, argon, or hydrogen) is passed through an electric arc causing it to become ionized and raised to temperatures in excess of 16,649°C (30,000°F). The relatively narrow plasma jet melts and displaces the workpiece material in its path.
29. Ultrasonic Machining	This operation is a mechanical process designed to effectively machine hard, brittle materials. It removes material by the use of abrasive grains which are carried in a liquid between the tool and the work, and which bombard the work surface at high velocity.
30. Sintering	This operation is the process of forming a mechanical part from a powdered metal by fusing the particles together under pressure and heat. The temperature is maintained below the melting point of the basis metal.
31. Laminating	This operation is the process of adhesive bonding layers of metal, plastic, or wood to form a part. Water is not often used in this operation; however, occasional rinsing or cooling may occur in conjunction with laminating. The waste generated could contribute to the common metals and oily waste types.
32. Hot Dip Coating	This operation is the process of coating a metallic workpiece with another metal to provide a protective film by immersion in a molten bath. Galvanizing (hot dip zinc) is the most common hot dip coating. Water is used for rinses following precleaning and sometimes for quenching after coating. These wastewaters can contribute to the common metals waste type.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
33. Sputtering	This operation is the process of covering a metallic or non-metallic workpiece with thin films of metal. The surface to be coated is bombarded with positive ions in a gas discharge tube, which is evacuated to a low pressure.
34. Vapor Plating	This operation is the process of decomposition of a metal or compound upon a heated surface by reduction or decomposition of a volatile compound at a temperature below the melting point of either the deposit or the basis material.
35. Thermal Infusion	This operation is the process of applying a fused zinc, cadmium, or other metal coating to a ferrous workpiece by inbuing the surface of the workpiece with metal powder or dust in the presence of heat.
36. Salt Bath Descaling	This operation is the process of removing surface oxides or scale from a workpiece by immersion of the workpiece in a molten salt bath or a hot salt solution. Molten salt baths are used to remove oxides from stainless steels and other corrosion-resistant alloys. These baths contain molten salts, caustic soda, sodium hydride and chemical additives. These contaminants (and a small amount of base material and oils) enter wastewater streams through rinsing, spills, leaks, batch dumps of process solutions, and improper handling of sludge produced by the process. Wastewaters produced by salt bath descaling contribute to the common metals and oily waste types.
37. Solvent Degreasing	This operation is a process for removing oils and grease from the surface of a workpiece by the use of organic solvents such as aliphatic petroleums, aromatics, oxygenated hydrocarbons, halogenated hydrocarbons, and combinations of these classes of solvents. These pollutants can enter wastewater streams and contribute to the toxic organic waste type.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
38. Paint Stripping	This operation is the process of removing an organic coating from a workpiece. The stripping of such coatings is usually performed with caustic, acid, solvent, or molten salt. The stripping wastes can contain any of the constituents of the paint being removed, as well as a small amount of the basis material beneath the paint and the constitutents of the stripping solution. Wastes are primarily generated by rinsing and can also contain small amounts of emulsified oils. Wastes produced belong to the common metals and oily waste types and may contain toxic organics.
39. Painting	This operation is the process of applying an organic coating to a workpiece.
40. Electrostatic Painting	This operation involves the application of electrostatically charged paint particles to an oppositely charged workpiece followed by thermal fusing of the paint particles to form a cohesive paint film.
41. Electropainting	This operation is the process of coating a workpiece by either making it anodic or cathodic in a bath that is generally an aqueous emulsion of the coating material. Electropainting is used primarily for primer coats because it gives a fairly thick, highly uniform, corrosion resistant coating in relatively little time. Ultrafiltration is used in connection with electropainting to concentrate paint solids. Wastewaters from these unit operations can contribute to the common metals, hexavalent chromium, and solvent waste types.
42. Vacuum Metalizing	This operation is the process of coating a workpiece with metal by flash heating metal vapor in a high-vacuum chamber containing the workpiece. The vapor condenses on all exposed surfaces.
43. Assembly	This operation involves the fitting together of previously manufactured parts or components into a complete machine, unit of a machine, or structure.

TABLE 1. METAL FINISHING CATEGORY UNIT OPERATIONS (Continued)

Unit Operations	Summary Description of Unit Operations
44. Calibration	This operation involves the application of thermal, electrical, or mechanical energy to set or establish reference points for a component or complete assembly.
45. Testing	This operation involves the application of thermal, electrical, or mechanical energy to determine the suitability or functionality of a component or complete assembly. Leak testing, final washing (automobiles, etc.), and test area washdowns enter wastestreams and may contain oils and fluids used at testing stations as well as heavy metal contamination derived from the component being tested. These wastewaters can contribute to the common metals and oily waste types.
46. Mechanical Plating	This operation is the process of depositing metal coatings on a workpiece via the use of a tumbling barrel, metal powder, and usually glass beads for the impaction media. The operation is subject to the same cleaning and rinsing operations that are applied before and after the electroplating operation.

Note: Unit Operations 1 through 6 are considered to be core operations. If a facility does not perform at least one of these six electroplating operations, it is not subject to the Metal Finishing regulation.

CERTIFICATION A

ELECTROPLATING/METAL FINISHING EXEMPTION

I have personally examined and familiar with the operations performed at this facility and with the wastewaters discharged from these operations. I certify that this facility does not perform any of the six operations listed below. I am aware that there are significant penalties for submitting false information.

1. Electroplating
2. Electroless Plating
3. Anodizing
4. Coatings
5. Chemical Etching and Milling
6. Printing Circuit Board Manufacturing

_____ _____

Authorized Representative Date

_____

Title

CERTIFICATION B

EXISTING SOURCE VERIFICATION

I am personnally familiar with the date that this facility began operation. I certify that this facility began operation before September 1, 1982. I am aware that there are significant penalties for submitting false information.

_____ _____

Authorized Representative Date

_____

Title

CERTIFICATION C

JOB SHOP VERIFICATION

I have personally examined and am familiar with the operations performed at this facility and with the amounts and ownership of materials undergoing these operations. I certify that in a calendar year, this facility owns less than 50% (area basis) of the materials which undergo those of the forty-six metal finishing operations listed below that are performed at this facility. I am aware that there are significant penalties for submitting false information.

_____ _____

Authorized Representative Date

_____

Title

1. Electroplating
2. Electroless Plating
3. Anodizing
4. Coatings
5. Etching and Chemical Milling
6. Printed Circuit Board Manu.
7. Cleaning
8. Machining
9. Grinding
10. Polishing
11. Barrel Finishing
12. Burnishing
13. Impact Deformation
14. Pressure Deformation
15. Shearing
16. Heat Treating
17. Thermal Cutting
18. Welding
19. Brazing
20. Soldering
21. Flame Spraying
22. Sand Blasting
23. Abrasive Jet Machining
24. Electrical Discharge Mach.
25. Electrochemical Machining
26. Electron Beam Machining
27. Laser Beam Machining
28. Plasma Arc Machining
29. Ultrasonic Machining
30. Sintering
31. Laminating
32. Hot Dip Coating
33. Sputtering
34. Vapor Plating
35. Thermal Infusion
36. Salt Bath Descaling
37. Solvent Degreasing
38. Paint Stripping
39. Painting
40. Electrostatic Painting
41. Electropainting
42. Vacuum Metalizing
43. Assembly
44. Calibration
45. Testing
46. Mechanical Plating

CERTIFICATION D

IPCBM VERIFICATION

I have personally examined and am familiar with the products manufactured at this facility and to what end they are manufactured. I certify that this facility manufactures printed circuit boards principally for sale to other companies. I am aware that there are significant penalties for submitting false information.

_____ _____

Authorized Representative Date

CERTIFICATION E

ELECTROPLATING/METAL FINISHING EXEMPTION

I have personally examined and familiar with the operations performed at this facility and with the wastewaters discharged from these operations. I certify that this facility does not discharge from any of the forty-six electroplating/metal finishing operations. I am aware that there are significant penalties for submitting false information.

_____ _____

Authorized Representative Date

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Title