Thursday, May 28, 2020

11:00 am - 12:30 pm

CWEA Environmental Compliance Inspector - Grade 2 Certification Training Webinar

This is a great opportunity to focus on areas of the exam that most colleagues have trouble with studying. The goal is to assist participants in gaining knowledge about the metal finishing category and understanding how and when to apply the appropriate regulations.

Learning Objective(s):
After participating in this session, attendees will be able to:

- All active participants will be able to confidently recognize and decipher which requirements are applicable when encountering industrial user that fall into the Metal Finishing Category.

CWEA Contact Hours: 1.8 towards Environmental Compliance Inspector certification

Introducer: Eric Van Cleave, Southern California Regional Sales Manager, SmartCover

Eric Van Cleave is the Southern California Regional Sales Manager with SmartCover Systems. He has a degree in Industrial and Manufacturing Engineering from the University of Missouri and started working for SmartCover Systems in June 2017. He previously worked in Environmental Construction and has been in Engineering Sales for the past 8 years. He is also the TCP Chair for the CWEA San Diego Section.

Moderator: Shannon Simmers, Regulatory Compliance Officer, City of Redlands

Shannon Simmers, Regulatory Compliance Officer for the City of Redlands, CA is responsible for the Pretreatment Program and other regulatory requirements for the City's WWTP, collections system and stormwater requirements to name a few. She has worked in the Environmental Compliance Field since 2014. Prior to that she worked in the production industry where she held positions as a Final Inspector, Quality Control Technician and a Quality Assurance Lab Technician. She holds the following certifications: an ECI Grade 2, QISP, a Wastewater Operator Grade 2, a Water Treatment Operator Grade 1, and a Distribution Operator Grade 1. She has an Associates Science degree in Water Supply Technology. She is a P3S Executive Committee Past Chair and the TCP Training Liaison. She is involved in several projects with CWEA and other organizations such as the TCP Train the Trainer program and the CSUS PFI Update Subcommittee. She is also a Subject Matter Expert for the ECI exam and was involved with the recent ECI exam re-validation and revisions to the ECI Study guides.

Speaker: George Munoz, Senior Environmental Compliance Inspector, City of Riverside

In 1999, George Munoz started work as an Environmental Consultant inspecting commercial, industrial, and residential facilities across the United States for lead based paint, asbestos, and mold. During his time as a

consultant, he began teaching courses for EPA Region 9. In 2007, he joined the City of Riverside Environmental Compliance Team where he continually learns to adapt to the constant ever-changing industry. I currently hold Grade III Environmental Compliance Inspector Certification, QISP, and involved in CWEA certification training.

CWEA

Skills Based Training

ENVIRONMENTAL COMPLIANCE INSPECTION

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ECI Grade 2: KSA 222

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ECI Grade 2 Job Knowledge

Today we will cover these topic(s) areas:

KSA 222

ECI Grade 2 *Exam Blueprint & Suggested References*

AGENDA

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KSA 222 Description

Prepare written notices of requirements and violations of regulations.

- Recall reporting requirements.
- Understand Metal Finishing and how it could affect a POTW.

KSA 222

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KSA 222 Suggested References

Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 2,3,8 (8.30-8.311, Table 8.2)

Treatment of Metal Waste streams Ch.1 & 2

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Metal Finishing Category

Metal Electroplater and Metal Finisher group SIC 34-39 (NAICS Groups 331-421) are the largest group potentially subject to the categorical regulations.

Electroplating Category 40 CFR 413 Point Source Existing Source (PSES) Indirect Dischargers

Metal Finishers Category 40 CFR 433 Point Source New Source (PSNS) Indirect Dischargers

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Metal Finishing Category

40 CFR 413 Electroplating Category applied to pre-existing facilities which at the time only controlled facilities that were ***electroplaters*** or ***circuit board*** manufacturers based on flow and type of shop (<10,000 GPD).

40 CFR 433 Metal Finishing Category covers everyone else and is more stringent on the basis of regulating more metals regardless of flow or type of shop.

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Metal Finishing Category

- There (6) operations that apply to the Metal finishing industry
  1. Electroplating
  2. Electroless Plating
  3. Anodizing
  4. Coating (phosphating, chromating, and coloring)
  5. Chemical Etching and Milling
  6. Printed Circuit Board Manufacturing

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Metal Finishing Category

- There (6) operations that apply to the Metal finishing industry

1. **Electroplating-** is a process that uses an electric current to reduce dissolved metal cations so that they form a thin coherent metal coating on an electrode.
2. **Electroless Plating-** is a non-galvanic plating method that involves several simultaneous reactions in an aqueous solution, which occur without the use of external electrical power.
3. **Anodizing-** is an electrochemical process that converts the metal surface into a decorative, durable, corrosion-resistant, anodic oxide finish.
4. **Coating-** (phosphating, chromating, and coloring)
5. **Chemical Etching and Milling-** Chemical milling or industrial etching is the subtractive manufacturing process of using baths of temperature-regulated etching chemicals to remove material to create an object with the desired shape.
6. **Printed Circuit Board Manufacturing-** A fiber and glass substrate is printed on with conductive metal (copper) and dipped in plating baths and etched.

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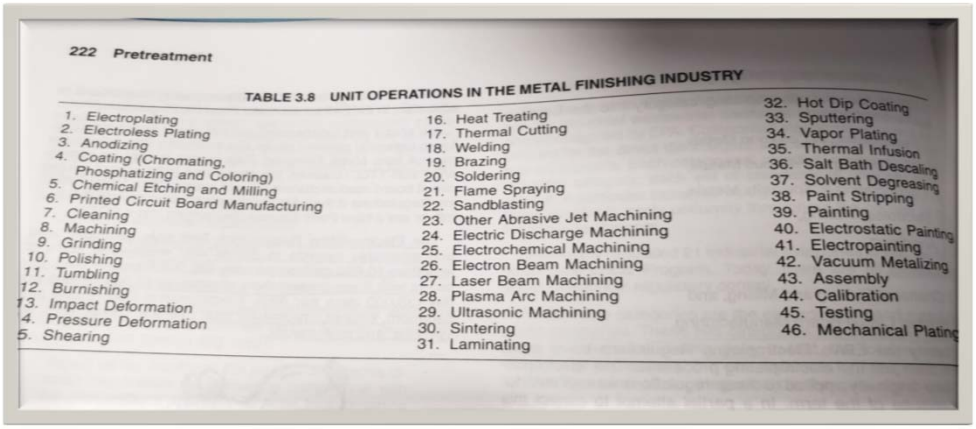

222 Pretreatment

TABLE 3.8 UNIT OPERATIONS IN THE METAL FINISHING INDUSTRY

1. Electroplating
2. Electroless Plating
3. Anodizing
4. Coating (Chromating, Phosphatizing and Coloring)
5. Chemical Etching and Milling
6. Printed Circuit Board Manufacturing
7. Cleaning
8. Machining
9. Grinding
10. Polishing
11. Tumbling
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. Sandblasting
23. Other Abrasive Jet Machining
24. Electric Discharge Machining
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

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Reporting Requirements for the Metal Finishing/ Categorical Industries

- Baseline Monitoring Reports
- Final Compliance Report
- Periodic Compliance Reports

(Reports must be signed by a responsible cooperate officer)

Must include the following:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

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Baseline Monitoring Report/ Compliance Schedule

- Must include the following

1. Identification of the indirect discharger
2. A list of environmental control permits,
3. Process description,
4. Reports on flows of regulated streams,
5. Results of sampling and analysis,
6. A certification statement by the discharger indicating compliance or non-compliance,
7. Description of steps taken to achieve compliance if non-compliance was indicated.

Compliance Schedules are typically used for industries that are in non-compliance and must be submitted with the BMR.

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Final Compliance Report

Must include the following

- Sampling results for the regulated pollutants,
- Average and maximum daily wastewater flows,
- A statement of compliance
- For non-compliance steps taken to achieve compliance

Periodic Compliance Reports

(minimum of two self monitoring reports semiannually)

Type of facility

Type of discharge

Type of concentration of pollutant in the discharge

Certification statement concerning accuracy of the submitted information

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Slug Loading Reporting

Slug Load- (aka batch dumps/bad batch) All categorical and non-categorical IUs must notify the POTW **immediately** of all discharges that could cause problems to the POTW

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Resampling to Confirm Violations by the Industrial User (IU)

If sampling performed by an IU indicates a violation, the user must notify the POTW within 24 hours of becoming aware of the violation. The IU also must repeat the sampling and analysis and submit the results of the repeat analysis to the POTW 30 days after becoming aware of the violation.

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Removal Credits

- Clean Water Act allows POTW to grant removal credits based on the efficiency achieved by the POTW.
- POTW must be capable of a 50% reduction of the Categorical limits and meeting the sewage sludge regulations (40 CFR 257).
  - Scenario 1: I'm a Aerospace company that uses chemical etching and anodizing that discharges to my local POTW. On average the POTW demonstrates that it can consistently remove lead from the influent around 35% which equals to 0.014mg/L, Aerospace Company discharges 0.023mg/L.
    - AS a POTW can it grant a removal credit for the Aerospace Company?
      - No, the POTW must be capable of demonstrating a consistent removal of 50% of the particular categorical pollutant.

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Types of Waste Streams

- Regulated- wastewater streams that are subject to the categorical pre-treatment standards (i.e. rinse water used to rinse electroplated parts)
- Unregulated – wastewater from a non-categorical process (i.e. rinse water from deburring activities)
- Dilution – wastewater from non-regulated processes (i.e. non contact cooling water, boiler blow down, sanitary wastewater)

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Total Toxic Organics (TTO)

- For each regulated industry ***category***, EPA specifies which organic compounds it will regulate. There are 111 Organic Chemicals that are regulated under 413, 433.
- Since there are so many chemicals to be sample for it can be very expensive.

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Total Toxic Organics (TTO)

For the Metal Finishing and Electroplating Industry, in place of monitoring for TTO, control authorities may allow IU's to submit a SOLVENT MANAGEMENT PLAN (Also known as a Toxic Organic Management Plan (TOMP))for approval.

TOMP- Identification of toxic organics used, quantify each toxic organic used, the use of each toxic organic, and the method of disposal instead of dumping, such as hauling, reclaim, or incineration.



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Total Toxic Organics (TTO)

The IU must submit the follow statement on a semiannual basis:

- Based on my inquiry of the persons directly responsible for managing compliance with the pretreatment standard for TTO, I certify that, to the best of my knowledge and belief, no dumping of concentrated toxic organics into wastewaters has occurred since filing the last discharge monitoring report. I further certify that this facility is implementing the solvent management plan submitted to the control authority.

TTO is **REQUIRED** for Baseline Monitoring Report and Final Compliance Reports, **except** where the POTW allows for oil/grease measurements to be substituted.

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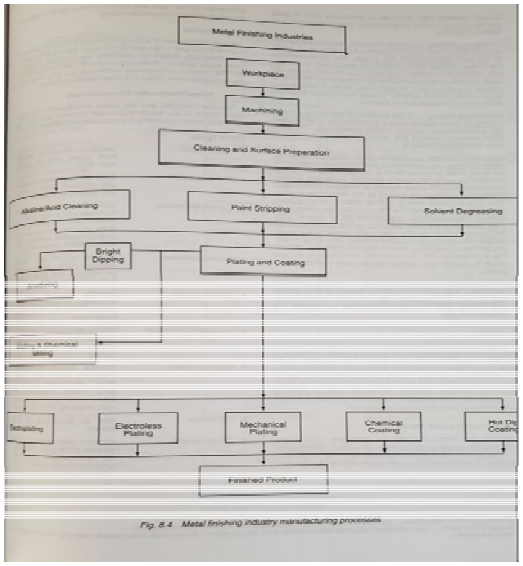
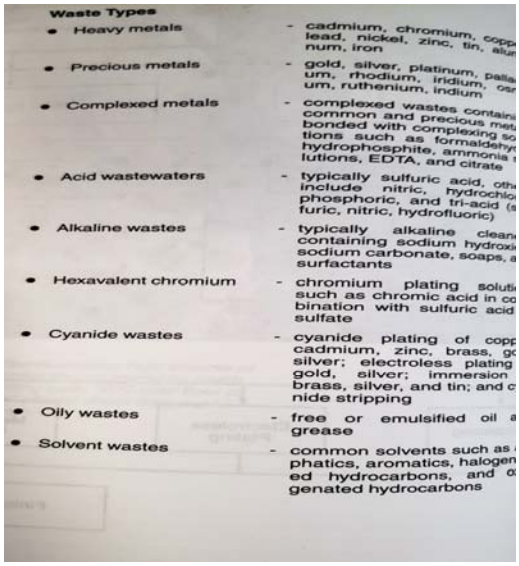


Fig. 8.4 Metal finishing industry manufacturing processes



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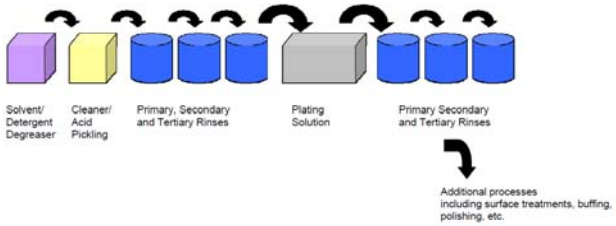
The following schematic illustrates the layout of a generic plating process line:



The arrows indicate the direction in which the work pieces move through a plating line. A combination of the following chemicals may be used to clean and prepare the surface
of the work piece:

- Solvent degreasers,
- Alkaline cleaners,
- Acid pickling solution, *or*
- Other process solutions

Surface preparation and cleaning typically removes
- Dirt
- Oxidation, *and*
- Various contaminants from the work piece.

This eventually leads to ***contamination*** of the cleaning solution with dissolved metal and various other, potentially hazardous, contaminants. After the surface of the work piece is cleaned and prepared, it is immersed in the plating solution where an ***applied electrical current*** or a ***chemical reaction*** causes dissolved metal in the plating solution to be plated onto the surface of the work piece. After being rinsed, the work piece may receive ***additional treatments*** with various chemicals, or may be buffed or polished. The resulting product is a metal piece ready for use in any one of many applied industries.

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Metal Finishing process

Waste streams containing cyanide must never be allowed to mix with acidic waste streams due to the generation of toxic hydrogen cyanide gas.

Hexavalent chromium (very toxic) must be reduced to trivalent chromium before chromium can be removed by hydroxide precipitation.

Cyanide must be destroyed (oxidized) before metals can be precipitated.

Complex metals may be precipitated at very high pH levels, for this reason **separation** of waste streams will generate high removal for low cost for specific pollutants.

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Metal Finishing process

Precipitation

What is precipitation? It is a process of making soluble/liquid compounds insoluble. Specifically applicable to streams with heavy metals. By the addition of lime or caustic soda (most common, readily available) heavy metals can be precipitated and combined with solids removal process.

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Metal Finishing process

Hexavalent chromium must be chemically treated (usually with gaseous sulfur dioxide or sodium bisulfite) to reduce the hexavalent chromium to trivalent chromium. Once chrome reduction has been achieved, the trivalent chromium can be treated with other metal by alkaline precipitation.

ANY METAL WASTE CONTAINING OILS SHOULD BE TREATED SEPERATELY BY SEPERATION PROCESSES (oils can prevent the proper operation of treatment monitoring probes)

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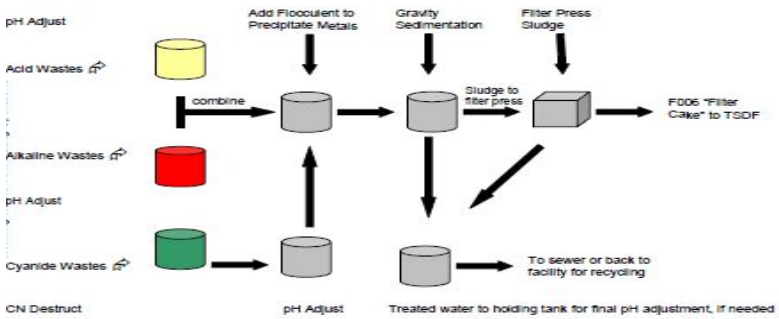
A typical treatment process is depicted in the following schematic diagram:



This figure illustrates how incompatible wastes, accumulated in separate collection tanks, are treated to facilitate compatibility (pH adjustment and cyanide destruction) before being combined. A flocculent is added to the waste to facilitate precipitation, generating a sludge as a metal precipitate. Next, gravity sedimentation is utilized to collect the precipitate, which is pumped to a filter press to be dried. Treated water from this process may be discharged to the sewer, held in a tank for one final pH adjustment and then discharged to the sewer, or redirected back to the plating operation if the facility is recycling.

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Metal Finishing process

Neutralization of wastewater with low pH (acidic) is typically achieved by adding calcium oxide or lime(CaO), magnesium oxide (MgO), calcium hydroxide (Ca(OH)2) which is a form of hydrated lime, magnesium hydroxide(Mg(OH)2), sodium hydroxide (NaOH, caustic soda) or soda ash (Na2CO3).

Neutralization of wastewater with high pH (basic) is typically achieved by the addition of acids such as sulfuric acid (H2SO4) and hydrochloric acid (HCI). Carbon dioxide (CO2)and sulfuric dioxide (SO2) can be applied in the gaseous form to lower pH.

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Metal Finishing Category

How might the Metal Finishing Industry Effect a POTW?

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Effects of Metal Finishers on the POTW

The higher degrees of treatment are more sensitive to upsets.

Secondary and tertiary biological processes such as activated sludge, nitrification, denitrification, and anaerobic digestion can be upset by toxic "overdose" of heavy metals.

The disposal of the POTW effluent and sludge are also affected by Metal Finishers. Water reuse regulations are more stringent than receiving water discharge.

POTW sludge, if used for resale as composed has stricter requirements than it would for landfill. If levels of toxicity in sludge are to high the sludge may have to be considered RCRA waste.

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Source Control (Pollution Prevention)

Pollution Prevention focuses on activities which "prevent" the generation of wastes.

Waste minimization looks at how to reduce the "volume" or the "strength" of waste.

Examples of pollution prevention: change in raw materials, modification of manufacturing process, modification of equipment, change operating guidelines, housekeeping, reuse/recycling.

Examples of waste minimization: physical treatment (EQ, screening, sedimentation, floatation, filtration), chemical treatment (neutralization, precipitation), biological treatment, land and thermal treatment.

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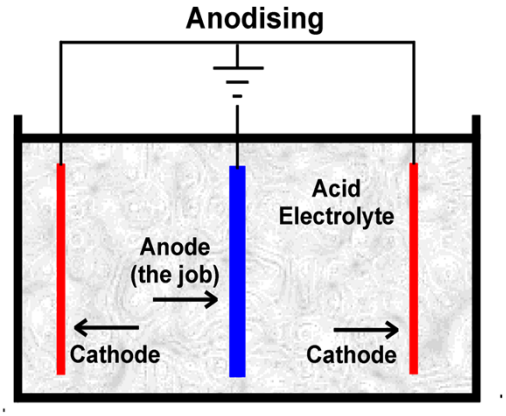

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QUESTIONS?

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