APPENDIX 112F

HARD AND DECORATIVE CHROMIUM ELECTROPLATING AND CHROMIUM ANODIZING TANKS (40 CFR 63 Subpart N)

CAA SECTION 112 NESHAP

Synopsis: Chromium Electroplating and Anodizing NESHAP

CFR Location: 40 CFR 63 Subpart N

Regulatory Activity: Final Rule: 25 Jan 95 (60 FR 4948)
Amendments: 24 May 95 (60 FR 27598); 27 Jun 95 (60 FR 33122); 03 Jun 96 (61 FR 27785) 11 Aug 97 (62 FR 42918)

Affected Sources: Major and Area Sources of HAPs

Rule Summary: This rule affects new and existing electroplating and anodizing operations. Requirements include: emission limits or alternative bath surface tension limits, work practice, compliance testing and monitoring, recordkeeping and reporting. Hard chromium electroplating tanks must comply with an emission limit. Decorative chromium electroplating and anodizing sources must comply with either a surface tension limit or an emission limit.

NESHAP DEADLINE MATRIX

Source	Date C/R Commenced	Date of Startup	Notification Requirements	Notification Deadlines	Compliance Deadline	Compliance Status Report Deadline	Ongoing Status Reports
Existing	≤16 Dec 93	<25 Jan 95	Initial Notification	24 Jul 95 *63.347(c)(1)*	25 Jan 96[a] 25 Jan 97[b] *63.343(a)(1)*	If performance test is required: 90 days after completion of test. *63.347(e)(3)* If test is not required: 30 days after applicable compliance deadline *63.347(e)(4)*	Major source: semiannually Area source: annually *63.347(g), 63.347(h)*
		>25 Jan 95	Not Addressed: Assume same as above.	Not Addressed: Assume same as above.			
New	>16 Dec 93 ≤25 Jan 95	<25 Jan 95	Initial Notification	24 Jul 95 *63.347(c)(1)*	25 Jan 95 *63.343(a)(2)*		
		>25 Jan 95	Notice of C/R and Actual C/R Date Startup Date	ASAP before startup but NLT 26 Mar 95 *63.345(b)(5)(ii) & 63.347(c)(2)(i)* 30 days after *63.347(c)(2)(iii)*	Startup *63.343(a)(2)*		
	≥25 Jan 95	>25 Jan 95	Notice of C/R Date C/R Began Startup Date	ASAP before C/R *63.345(b)(i)* 30 days after *63.347(c)(2)(ii)* 30 days after *63.347(c)(2)(iii)*			

C/R = construction or reconstruction ASAP = as soon as practicable NLT = not later than

[a] Deadline for decorative chromium electroplating tanks.

[b] Deadline for hard chromium electroplating and chromium anodize tanks.

REGULATION STATUS

EPA promulgated the Chromium NESHAP on 25 Jan 95 (60 FR 4948). Subsequent corrections and amendments are reflected in latest version of the Code of Federal Regulations, Volume 40, Part 63, Subpart N and are also highlighted in the Synopsis Table and the Subsequent Regulatory Activity sections of this appendix.

RULE SUMMARY

Applicability

This rule applies to every chromium electroplating and chromic acid anodizing tank in the United States and its Territories.

Key Definitions

Existing source means any affected source the construction or reconstruction of which is commenced on or before 16 Dec 93.

New source means any affected source the construction or reconstruction of which is commenced after 16 Dec 93.

Reconstruction means the replacement of components of an affected or a previously unaffected stationary source to such an extent that:

(1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and

(2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a State) pursuant to section 112 of the Act. Upon reconstruction, an affected source, or a stationary source that becomes an affected source, is subject to relevant standards for new sources, including compliance dates, irrespective of any change in emissions of hazardous air pollutants from that source.

Standards

Table 1 summarizes the emission standards. Note: These Federal standards are not as stringent as California and Washington State chromium electroplating and anodizing standards.

Hard chromium electroplating operations must comply with an emission concentration limit.

Decorative chromium electroplating and chromium anodizing sources must comply with either:

1) a surface tension limit; or

2) an emission concentration limit.

Although not shown in the table, decorative chromium electroplating sources using a ***trivalent*** chromium bath have three compliance options:

1) use a wetting agent;

2) comply with a surface tension limit; or

3) comply with an emission limit.

These emission limitations apply only during tank operation, including periods of startup and shutdown.

TABLE 1. STANDARDS FOR CHROMIUM PLATING AND ANODIZING TANKS

Type of Tank	Emission Limitations	
	Small Facility	**Large Facility**
Hard Chromium Plating Tanks		
All existing tanks	0.03 mg/dscm (1.3×10^{-5} gr/dscf)	0.015 mg/dscm (6.6×10^{-6} gr/dscf)
All new tanks	0.015 mg/dscm (6.6×10^{-6} gr/dscf)	0.015 mg/dscm (6.6×10^{-6} gr/dscf)
Decorative Chromium Plating Tanks Using a Chromic Acid Bath		
All new and existing tanks	0.01 mg/dscm (4.4×10^{-6} gr/dscf) or 45 dynes/cm (3.1×10^{-3} lb_f/ft)	
Chromium Anodizing Tanks		
All new and existing tanks	0.01 mg/dscm (4.4×10^{-6} gr/dscf) or 45 dynes/cm (3.1×10^{-3} lb_f/ft)	

The emission limitation for all ***new and existing*** hard chromium electroplating tanks that are located at ***large*** facilities is based on the use of a composite mesh-pad system. A large facility has a maximum cumulative potential rectifier capacity greater than or equal to 60 million ampere-hours per year (amp-hr/yr).

The emission limitation for ***existing*** hard chromium electroplating tanks that are located at ***small*** facilities is based on the use of a packed-bed scrubber. A small facility has a maximum cumulative potential rectifier capacity less than 60 million amp-hr/yr. Alternatively, ***existing*** facilities that have rectifier capacities greater than 60 million amp-hr/yr can still comply with the small facility emission limit if the actual annual amperage can be documented (using non-resettable totalizing amp-hr meters) to be less than 60 million amp-hr/yr.

For all ***existing and new*** decorative chromium electroplating and chromium anodizing, the standard is based on the use of fume suppressants.

Note: Although these technologies form the basis for the standards, any technology can be used as long as it meets the prescribed emission limitation.

Work Practice Requirements

Owners and operators of chromium electroplating and anodizing sources are subject to work practice standards, which require them to prepare an operation and maintenance (O&M) plan to be implemented no later than the compliance date. Note: Decorative chromium electroplating sources using a trivalent chromium bath with a wetting agent are exempt from the work practice requirements. The O&M plan shall be incorporated by reference into the source's title V permit and shall include the following elements:

1. The plan shall specify the operation and maintenance criteria for the affected source, the add-on air pollution control device (if such a device is used to comply with the emission limits), and the process and control system monitoring equipment, and shall include a standardized checklist to document the operation and maintenance of this equipment;
2. For sources using an add-on air pollution control device or monitoring equipment to comply with this subpart, the plan shall incorporate the work practice standards for that device or monitoring equipment as identified in **Table 2**. The work practice standards do not apply to sources that comply with a surface tension standard.

TABLE 2. SUMMARY OF WORK PRACTICE STANDARDS

Work practice standards	Frequency
Control: Packed-bed scrubber (PBS)	
1. Visually inspect to ensure there is proper drainage, no chromic acid buildup on the packed beds, and no evidence of chemical attack on the structural integrity of the device.	Quarterly
2. Visually inspect back portion of the chevron blade mist eliminator to ensure that it is dry and there is no breakthrough of chromic acid mist.	Quarterly
3. Same as number 3 above.	Quarterly
4. Add fresh makeup water to the top of the packed bed.[a,b]	Whenever makeup water is added
Control: Composite mesh-pad (CMP) system or combination PBS/CMP system	
1. Visually inspect device to ensure there is proper drainage, no chromic acid buildup on the pads, and no evidence of chemical attack on the structural integrity of the device.	Quarterly
2. Visually inspect back portion of the mesh pad closest to the fan to ensure there is no breakthrough of chromic acid mist.	Quarterly
3. Visually inspect ductwork from tanks to the control device to ensure there are no leaks.	Quarterly
4. Perform washdown of the composite mesh-pads per manufacturer recommendations.	Per mfr.
Control: Fiber-bed mist eliminator[c]	
1. Visually inspect fiber-bed unit and prefiltering device to ensure there is proper drainage, no chromic acid buildup in the units, and no evidence of chemical attack on the structural integrity of the devices.	Quarterly
2. Visually inspect ductwork from tanks to the control device to ensure there are no leaks.	Quarterly
3. Perform washdown of fiber elements per manufacturer recommendations.	Per mfr.
Control Technique: Air pollution control device not listed in rule	
To be proposed by the source for approval by the Administrator	As approved
Monitoring Equipment: Pitot tube	
Backflush with water, or remove from the duct and rinse with fresh water. Replace in the duct and rotate 180 degrees to ensure that the same zero reading is obtained. Check pitot tube ends for damage. Replace pitot tube if cracked or fatigued.	Quarterly
Monitoring Equipment: Stalagmometer	
Follow manufacturers recommendations.	Per mfr.

a If greater than 50 percent of the scrubber water is drained (e.g., for maintenance purposes), makeup water may be added to the scrubber basin.

b For horizontal-flow scrubbers, top is defined as the section of the unit directly above the packing media such that the makeup water would flow perpendicular to the air flow through the packing. For vertical-flow units, the top is defined as the area downstream of the packing material such that the makeup water would flow countercurrent to the air flow through the unit.

c Work practice standards for the control device installed upstream of the fiber-bed mist eliminator to prevent plugging do not apply as long as the work practice standards for the fiber-bed unit are followed.

Monitoring Requirements

Table 3 summarizes the monitoring requirements.

Any source complying with an emission concentration limit must perform an emission test to demonstrate initial compliance. Decorative chromium electroplating or chromium anodizing sources complying with the surface tension limit are exempt from the initial compliance emission tests.

Initial compliance emission tests must be conducted according to EPA approved methods. Continuous compliance is demonstrated by monitoring parameter(s) of the control technique used to comply with the emission limitation. Decorative chromium electroplating sources using a trivalent chromium bath with a wetting agent are exempt from the continuous monitoring requirements.

TABLE 3. SUMMARY OF MONITORING REQUIREMENTS

Control technique used to comply	Initial compliance test	Parameter(s) for continuous compliance monitoring	Frequency of compliance monitoring
Composite mesh-pad (CMP) system	Yes	Pressure drop across the unit.	Daily
Packed-bed scrubber (PBS)	Yes	Velocity pressure at the inlet of the control system and pressure drop across the unit.	Daily
Combination PBS/CMP system	Yes	Pressure drop across the unit.	Daily
Fiber-bed mist eliminator	Yes	Pressure drop across the fiber-bed mist eliminator and the pressure drop across the upstream control device used to prevent plugging.	Daily
Wetting agent-type fume suppressant to control surface tension.	Yes (Unless the criteria of § 63.343(b)(2) are met).	Surface tension.	Once every 4 hours[a]
Foam blankets	Yes	Foam thickness.	Hourly[a]
Air pollution control device (APCD) not listed in rule	Yes	To be proposed by the source for approval by Administrator.	N/A

[a] Frequency can be decreased according to § 63.343(c)(5)(ii) and (c)(6)(ii) of subpart N.

Recordkeeping and Reporting Requirements

Owners or operators of affected sources are required to keep the records to document compliance with these standards. Records include those associated with the work practice standards, performance (initial compliance) test results, compliance monitoring data, duration of exceedances, and rectifier capacity or

amp-hr records to prove that facility is a small existing source, if applicable. Reports must also be submitted periodically. **Table 4** identifies the reports that must be submitted and the reporting timeframes.

TABLE 4. SUMMARY OF REPORTING REQUIREMENTS

Section in Subpart N	Description	Timeframe for submittal
§ 63.345(b)	Notification of new construction or reconstruction	Depends on date of construction or reconstruction--see § 63.345(b)(5)
§ 63.347(c)(1)	Initial notification of startup of affected source before 25 Jan 95	24 Jul 95
§ 63.347(c)(2)	Initial notification of startup of affected source after 25 Jan 95:	
	- Date when construction commenced	Within 30 days of commencement for sources built after 25 Jan 95, or with notification required by § 63.345(b) if built prior to 25 Jan 95
	- Date of actual startup	Within 30 days of startup
§ 63.347(d)	Notification of performance test	At least 60 days prior to test [a]
§ 63.347(e)	Notification of compliance status	Within 90 days of performance test [a] (if a test is conducted), or within 30 days of compliance date [b]
§ 63.347(f)	Notification of performance test results	Within 90 days of performance test [a]
§ 63.347(g)	Compliance status reports for major sources	2 times/yr, or 4 times/yr if exceedances occur or if requested by Administrator
§ 63.347(h)	Compliance status reports for area sources	Complete once/yr and maintain on site, or 2 times/yr if exceedances occur or if requested by Administrator
§ 63.347(i)	Initial notification for users of trivalent chromium baths	- 24 Jul 95
	Notification of compliance status for users of trivalent chrome baths	- Within 30 days of compliance date [b]
	Notification of process change	- Within 30 days of process change

[a] Sec. 63.7 of the General Provisions specifies when performance tests must be performed. In general, if a performance test is required, existing sources must perform the test within 180 days after the applicable compliance date. Existing source means any affected source the construction or reconstruction of which is commenced on or before 16 Dec 93. New sources must perform the test within 180 days after a startup or by 24 Jul 95, whichever is later.

[b] Compliance dates: 25 Jan 97 for hard chromium and chromium anodizing; 25 Jan 96 for decorative chromium.

NESHAP General Provisions

The final rule contains a table that shows which sections of the NESHAP General Provisions (40 CFR 63 Subpart A) apply and which do not.

Compliance Deadlines

All existing sources performing hard chromium electroplating and chromium anodizing must comply with the emission limitations by 25 Jan 97. All existing sources performing decorative chromium electroplating must comply with the emission limitations by 25 Jan 96. All new and reconstructed sources must comply immediately upon startup.

Changes Between Proposal and Promulgation

The Services Steering Committee submitted comments to EPA on the proposed rule. EPA agreed with most recommendations. The comments submitted by the SSC and EPA's responses are published on the HAP Status Binder Web Site.

The major changes between proposal and promulgation include: longer compliance times, elimination of daily monitoring of scrubber water concentration, reduction of most other daily monitoring to quarterly or less.

SUBSEQUENT REGULATORY ACTIVITY

24 May 95 (60 FR 27598) Amendments

Table 3 and 4 of the final rule were printed twice in the Federal Register. This amendment deletes the duplicate copies.

27 Jun 95 (60 FR 33122) Amendments

These amendments contain 17 changes to the rule. None of the changes made "headlines" but were necessary to correct typographical errors and clarify the regulatory text.

03 Jun 96 (61 FR 27785) Amendments

These amendments give States the option to defer for five years the Title V permitting of ***area sources*** affected by several NESHAPs. Affected area sources are ***still required*** to meet all applicable emission control requirements established by the respective NESHAP. The following NESHAPs have been amended:

- Chromium NESHAP (40 CFR 63 Subpart N)
- Commercial Sterilization/Fumigation NESHAP (Subpart O)
- Perchloroethylene Dry Cleaning NESHAP (Subpart M)
- Secondary Lead Smelting NESHAP (Subpart X)

These amendments also ***permanently*** exempt certain area sources affected by the ***Chromium NESHAP*** from Title V permitting requirements. The area sources permanently exempt from Title V permitting are:

- Decorative chromium electroplating or chromium anodizing operations that use fume suppressants as an emission reduction technology.
- Decorative chromium electroplating operations that use a trivalent chromium bath that incorporates a wetting agent as a bath ingredient.

11 Aug 97 (62 FR 42918) Amendments (Pertains to California Sources Only)

On 30 Jan 97, EPA issued an interim final rule (IFR) purporting to provide compliance relief to California facilities that have hard chromium electroplating or chromium anodizing tanks. The intent was to prevent California sources from being subject to both the Federal NESHAP and State chromium rules while California and EPA resolved their differences. The IFR provided no practical relief to California sources because the compliance extension applied to only a few of the monitoring, reporting, and recordkeeping (MRR) requirements. The result was that California sources were technically in violation of several Federal compliance requirements.

EPA received comments on the IFR deficiencies from the California Air Resources Board (CARB) and the Services Steering Committee (SSC) asking EPA to provide comprehensive NESHAP relief to California sources while CARB and EPA resolve the differences between the Federal and State rules. Based on these comments, EPA is extending the ***California*** compliance date to 25 Jan 98 for ***all*** performance test and MRR requirements that apply to hard chromium electroplating and chromium anodizing tanks. Facilities must still be in compliance with the State chromium rules in the interim.

MILITARY SOURCES

Hard Chromium Plating

On the basis of Navy emission test data, 70% of sources were able to comply with the new standards using existing control equipment. The remaining sources likely installed new control devices or process modifications to comply. At the time this rule was issued in 1999, each Service had about seven facilities that still performed chromium electroplating.

Chromic Acid Anodizing

Navy emission test data indicates that all chromic acid anodizing operations could easily comply with the new standards by using existing control devices or surface tension additives.

COMPLIANCE COST

For Tanks Complying with Emission Concentration Standard

If existing control device performance is substantially out of compliance or otherwise inadequate, install a new control device. The capital costs in the following table are for a skid-mounted unit with an exhaust fan. Costs should be accelerated to include retrofit costs for the removal of existing control devices, site preparation, and possibly redesign and replacement of the existing industrial ventilation system.

	Exhaust Line Flow Rate		
Control Device	10,000 cfm	20,000 cfm	30,000 cfm
Packed Bed Scrubber (Wet Scrubber)	$25,000	$40,000	$60,000
Composite Meshpad Mist Eliminator	$30,000	$50,000	$70,000

Chemical additives and other process modifications can also be use in conjunction with existing control devices to comply with the emission standards. Chemical additive cost estimates are provided below. A process modification is anything that reduces chromium emissions at the source. Process modifications for chromium process tanks include: chemical additives (foam blankets and surfactants), floating plastic balls, and elimination of air agitation.

In order to guarantee a reduced emission concentration using process modifications, the control efficiency of the modifications must exceed the efficiency of any existing air emission controls. EPA data shows that packed-bed scrubbers and mesh-pad mist eliminators are constant emission concentration control devices. This means that the chromium emission concentration at the outlet of these devices is independent of the inlet chromium concentration. How can this be? The size of the chromium mist that escapes the additive-controlled tank is much smaller than the mist from an additive-free tank. The efficiency of a chromium control device decreases with decreasing particle size.

Therefore, using process modifications to reduce tank emissions by 95% will not substantially reduce the stack emission concentration if the emission control system is already achieving 95% chromium control efficiency. These process modifications would reduce the stack emission concentration on an exhaust line that has an emission control system achieving only 85% control.

In 1989, the Metal Finishing Association of Southern California (MFASC) studied the emission reduction potential of process modifications on the uncontrolled emissions from hard chrome tanks. Results show that emissions were reduced 98-99% by using a combination of a foam blanket, plastic balls, and eliminating air agitation. Emissions were reduced by 86-87% by using plastic balls and eliminating air agitation. MFASC did not evaluate the performance of using only a foam blanket. However, limited Navy emission test data shows that a foam blanket reduced

emissions from a hard chrome plating tank by 94%. Chemical manufacturer's have improved chemical additives over recent years. Additives alone can reduce emissions from decorative chrome and anodize tanks by as much as 99% which is why emission control devices are not required for tanks that comply with the surface tension limit.

For Tanks Complying with Surface Tension Standard

Surface tension is controlled using chemical tank additives. Control devices are not required if you are complying with surface tension limits. Technically you can remove existing control devices although it would be wise to check with your permitting authority first. It may be better to leave existing controls in place and operational as a backup in the event the surface tension standard is violated. The following table shows the 1994 estimated annual cost per tank for a tank with a surface area of 32 square feet.

	Chemical Additive		
Process Tank	Foam Blanket	Surfactant	Combination
Hard Chromium	$6,000	N/A	$6,000
Decorative Chromium	$3,000	$2,000	$2,500
Chromium Anodize	N/A	$2,000	N/A

CONTACTS

EPA: EPA Regional Offices

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