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1.1 Inspector Requirements

The following is a synopsis of what an Inspector must do at a chromium electroplating or chromium anodizing facility during an inspection. This synopsis is only to provide an overview and an Inspector should obtain a copy of the inspection checklists located before this Section 1.1 of this Chapter developed specifically for hard chromium electroplating, decorative chromium electroplating, and chromium anodizing sources (tanks). Table 1.1 is a summary of the requirements for each type of chromium electroplating or chromium anodizing facility.

1.1.1 Determine the type of the facility (see Table 1.2)
    1.1.1.1 Hard chromium electroplating facility
    1.1.1.2 Decorative chromium electroplating facility
    1.1.1.3 Chromium anodizing facility
    1.1.1.4 Exempt facility or tank
        1.1.4.1.1 Research or laboratory facility or tank
        1.1.4.1.2 Tanks with chromium solution but where no electrolic process occurs
        1.1.4.1.3 Tanks associated with chromium electroplating process, but where no chromium electroplating or chromium anodizing occurs

1.1.2 Determine whether the source is existing, new, or reconstructed
    1.2.1.1 Existing source if initial startup date was before 12/16/93.
    1.2.1.2 New or reconstructed if initial startup date is on or after 12/16/93.

1.1.3 Determine the size of the facility
    1.3.1.1 Hard chromium facility: large or small depending upon rectifier capacity and major or area source depending upon the potential to emit hazardous air pollutants
    1.3.1.2 Decorative chromium facility: major or area source depending upon the potential to emit hazardous air pollutants
    1.3.1.3 Chromium anodizing facility: major or area source depending upon the potential to emit hazardous air pollutants

1.1.4 Determine the type of air pollution control device used
    1.4.1.1 Add-on air pollution control device
        1.4.1.1.1 Composite mesh pad system (see Figure 1.1)
        1.4.1.1.2 Fiber bed mist eliminator (see Figure 1.2)
        1.4.1.1.3 Packed bed scrubber (see Figures 1.3, 1.4, and 1.5)
    1.4.1.2 Chemical fume suppressant or mist suppressant control device
        1.4.2.1.1 Foam blanket
        1.4.2.1.2 Wetting agent

1.1.5 Determine the emission limit for the source depending upon the number of tanks affected, type of facility, size of the facility and the type of air pollution control device used (see Tables 1.3 and 1.4)
  - 1.5.1.1 Single tank
    - 1.5.1.1.1 Hard chromium: large (0.015 mg/dscm) or small (0.015 or 0.030 mg/dscm)
    - 1.5.1.1.2 Decorative chromium: hexavalent solution (0.01 mg/dscm or surface tension), trivalent solution (0.01 mg/dscm or surface tension), trivalent solution with wetting agent as ingredient of bath (no standard)
    - 1.5.1.1.3 Chromium anodizing: 0.01 mg/dscm or surface tension

  - 1.5.1.2 Multiple tanks
    - 1.5.2.1.1 Hard chromium: see Table 1.4
    - 1.5.2.1.2 Decorative chromium: see Table 1.4
    - 1.5.2.1.3 Chromium anodizing: see Table 1.4

1.1.6 Determine whether the source met the required emission limit by the compliance date (see Table 1.5)
  - 1.6.1.1 Hard chromium electroplating: 1/25/95, 1/25/97, or immediately
  - 1.6.1.2 Chromium anodizing: 1/25/95, 1/25/96, or immediately
  - 1.6.1.3 Decorative chromium electroplating: 1/25/95, 1/25/97, or immediately

1.1.7 Determine if the operator has an operation and maintenance plan completed, follows the operation and maintenance plan, and properly maintains the facility, including:
  - 1.7.1.1 The tank
  - 1.7.1.2 The air pollution control equipment work practice standards (see Table 1.6)
  - 1.7.1.3 The air pollution monitoring equipment

1.1.8 Determine whether the operator did an initial performance test by the required time and gave proper initial notification to U.S. EPA and APCD or is exempt
  - 1.8.1.1 By the required dates (see Table 1.7)
  - 1.8.1.2 Developed a site specific plan and performance test report
  - 1.8.1.3 Sent or are sending a copy of the results to the APCD and U.S. EPA

1.1.9 Determine if the operator complies with the ongoing compliance monitoring requirements
  - 1.9.1.1 Ongoing compliance monitoring is done properly
    - 1.9.1.1.1 Ongoing compliance monitoring is technically done properly
    - 1.9.1.1.2 Ongoing compliance monitoring is done often enough (see Table 1.8)
    - 1.9.1.1.3 Proper operating parameter values are used (see Table 1.9)
  - 1.9.1.2 The results of ongoing compliance monitoring demonstrates that the source is in compliance with the regulations

1.1.10 Determine if the operator maintains the proper recordkeeping
  1.10.1.1 Inspection and maintenance records
  1.10.1.2 Malfunction records
  1.10.1.3 Performance test results
  1.10.1.4 Monitoring data
  1.10.1.5 Excess emission reports
  1.10.1.6 Process records
  1.10.1.7 Trivalent chromium bath records
  1.10.1.8 Miscellaneous records

1.1.11 Determine if the operator properly reports to U.S. EPA and/or APCD (see Table 1.10)
  1.11.1.1 Notification of construction or reconstruction
  1.11.1.2 Initial notification
  1.11.1.3 Notification of initial performance test
  1.11.1.4 Notification of performance test results
  1.11.1.5 Notification of compliance status
  1.11.1.6 Ongoing compliance status reports
  1.11.1.7 Trivalent chromium bath reports

Table 1.1
Requirements for Hard Chromium Electroplating, Decorative Chromium Electroplating, and Chromium Anodizing Facilities

Type of Source	Emission Limits (single tank)[1]	Compliance Date Emission Limits	Operation & Maintenance Plan[4]	Initial Performance Test	Ongoing Monitoring[6]	Recordkeeping[7]	Reporting[8]
Large, Hard Chromium							
Existing	0.015 mg/dscm	1/25/97	Required	Required by 7/24/97	Required	Required	Required
Reconstructed	0.015 mg/dscm	1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
New	0.015 mg/dscm	1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
Small, Hard Chromium							
Existing	0.030 mg/dscm	1/25/97	Required	Required by 7/24/97	Required	Required	Required
Reconstructed	0.015 mg/dscm	1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
New	0.015 mg/dscm	1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
Decorative Chromium using Hexavalent							
Existing	0.01 mg/dscm or surface tension ≤ 45 dynes/cm[2]	1/25/96	Required	Required by 7/24/96	Required	Required	Required
Reconstructed		1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
New		1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
Decorative Chromium using Trivalent if Wetting Agent is Not Ingredient							
Existing	0.01 mg/dscm or surface tension ≤ 45 dynes/cm[2]	1/25/96	Required	Required by 7/24/96	Required	Required	Required
Reconstructed		1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
New		1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required

Table 1.1
Requirements for Hard Chromium Electroplating, Decorative Chromium Electroplating, and Chromium Anodizing Facilities

Type of Source	Emission Limits (single tank)[1]	Compliance Date Emission Limits	Operation & Maintenance Plan[4]	Initial Performance Test	Ongoing Monitoring[6]	Recordkeeping[7]	Reporting[8]
Decorative Chromium using Trivalent if Wetting Agent is Ingredient							
Existing	No limit	1/25/96	Not required	Required by 7/24/96	Not required	Required	Required
Reconstructed	No limit	1/25/95 or immediately[3]	Not required	Various dates[5]	Not required	Required	Required
New	No limit	1/25/95 or immediately[3]	Not required	Various dates[5]	Not required	Required	Required
Chromium Anodizing							
Existing	0.01 mg/dscm or surface tension ≤ 45 dynes/cm	1/25/97	Required	Required by 7/24/97	Required	Required	Required
Reconstructed		1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required
New		1/25/95 or immediately[3]	Required	Various dates[5]	Required	Required	Required

[1] For multiple tanks see Table 1.4 for how to determine the emission limit.

[2] See Table 1.3 for details on how to determine whether 0.01 mg/dscm or surface tension ≤ 45 dynes/cm applies.

[3] A new or reconstructed source with initial startup date after 12/16/93, but before 1/25/95 must be in compliance by 1/25/95. A new or reconstructed source with an initial startup date after 1/25/95, must be in compliance immediately upon startup of the source.

[4] See Table 1.6 for the work practice requirements of an Operation and Maintenance Plan.

[5] By 7/24/95, if the initial startup date is before 1/25/95. Within 180 days after initial startup if the initial startup date is after 1/25/95.

[6] See Table 1.8 for the ongoing monitoring requirements.

[7] See Section 1.6.6 of the Inspector's Guidance Manual for the recordkeeping requirements.

[8] See Section 1.6.7 of the Inspector's Guidance Manual for the reporting requirements.

Table 1.2
Functions and Process Parameters Associated with Chromium Electroplating and Anodizing Tanks

Type of Operation	Functions	Process Parameters
Hard chromium electroplating	Provides a surface with functional properties such as: wear resistance, a low coefficient of friction, hardness, and corrosion resistance	<u>Federal specifications</u>: Plate thickness of 1.3 to 760 microns Current density of 150 to 600 A/ft^2 Plating time of 20 minutes to 36 hours <u>Other parameters</u>: Chromic acid concentration of 30 to 50 oz/gal Sulfuric acid concentration of 0.3 to 0.5 oz/gal Solution temperature of 120 to 150 F
Decorative chromium electroplating	Provides a bright surface with wear and tarnish resistance	<u>Federal specifications</u>: Plate thickness of 0.003 to 2.5 microns (chromic acid bath) or 0.13 to 25 microns (trivalent chromium bath) Current density of 50 to 220 A/ft^2 Plating time of 0.5 to 5 minutes <u>Other parameters</u>: Chromic acid concentration of 30 to 50 oz/gal Sulfuric acid concentration of 0.3 to 0.5 oz/gal Solution temperature of 100 to 115 F
Chromium anodizing	Provides corrosion resistance or electrical insulation	<u>Federal specifications</u>: Chromic acid concentrations of 6.67 to 13.3 oz/gal <u>Other parameters</u>: Film thickness of 0.02 to 0.05 microns Current density of 144 to 720 A/ft^2 Anodizing time of 30 to 60 minutes Solution temperature of 90 to 95 F pH of 0.5 to 0.85 Voltage of 20 or 40 volts

Figure 1.1

Composite Mesh Pad Eliminator

Figure 1.2

Fiber Bed Mist Eliminator

Figure 1.3

Horizontal Flow, Single Packed Bed Scrubber

Figure 1.4

Horizontal Flow, Double Packed Bed Scrubber

Figure 1.5

Horizontal-flow Chevron-blade Mist Eliminator with a Single Set of Blades

Table 1.3
Emission Limits For Chromium Electroplating Tanks -- Single Source / Tank

Single Tank	Existing, New, or Reconstructed Source	Hexavalent or Trivalent Solution	Use Wetting Agent as Control	Use Trivalent Solution & Wetting Agent is Ingredient	Required Emission Limit
Hard Chromium					total chromium in gas stream not exceed:
Large	Existing, New, or Reconstructed	n/a	n/a	n/a	0.015 mg/dscm
Small	Existing	n/a	n/a	n/a	0.03 mg/dscm
	New or Reconstructed	n/a	n/a	n/a	0.015 mg/dscm
Decorative Chromium	Existing, New, or Reconstructed	Hexavalent	No	n/a	total chromium in gas stream not exceed: 0.01 mg/dscm
			Yes	n/a	not allow the surface tension of the electroplating bath to exceed 45 dynes/cm
	Existing, New, or Reconstructed	Trivalent	No	No	total chromium in gas stream not exceed: 0.01 mg/dscm
			Yes	No	not allow the surface tension of the electroplating bath to exceed 45 dynes/cm
			n/a	Yes	No Standard
Chromium Anodizing	Existing, New, or Reconstructed	n/a	No	n/a	total chromium in gas stream not exceed: 0.01 mg/dscm
			Yes	n/a	not allow the surface tension of the electroplating bath to exceed 45 dynes/cm

Table 1.4
Emission Limits For Chromium Electroplating Tanks -- Multiple Sources / Tanks

Group of Tanks with Any One Tank Operating	Common Add-on Air Pollution Control Device	Each Tank Performs Same Type of Operation	Each Tank is Subject to the Same Emission Limits	Control Device Controls Nonaffected Tanks	Required Emission Limits
TYPE I:					
Hard Chromium					
Large: Existing, New, & Reconstructed	Yes	Yes	Yes	**No**	0.015 mg/dscm
Small:					
Existing	Yes	Yes	Yes	**No**	0.030 mg /dscm
New & Reconstructed	Yes	Yes	Yes	**No**	0.015 mg/dscm
Decorative Chromium	Yes	Yes	Yes	**No**	See Table 1.3
Chromium Anodizing	Yes	Yes	Yes	**No**	See Table 1.3
TYPE II:					
Large or Small Hard Chromium	Yes	Yes	Yes	Yes	See Note A
Decorative Chromium	Yes	Yes	Yes	Yes	See Note A
Chromium Anodizing	Yes	Yes	Yes	Yes	See Note A
TYPE III:					
Large or Small Hard Chromium	Yes	**No**	Yes	Yes or No	See Note B
Decorative Chromium	Yes	**No**	Yes	Yes or No	See Note B
Chromium Anodizing	Yes	**No**	Yes	Yes or No	See Note B
TYPE IV:					
Large or Small Hard Chromium	Yes	Yes	**No**	Yes or No	See Note C
Decorative Chromium	Yes	Yes	**No**	Yes or No	See Note C

Chromium Anodizing	Yes	Yes	**No**	Yes or No	See Note C

Note A: Special compliance provisions for multiple sources, performing the same type of operation, controlled by a common add-on air pollution control device:

(i) Calculate the cross-sectional area of each inlet duct, including those not affected by the standard.

(ii) Determine the total sample time per test run by dividing the total inlet area from all tanks connected to the control system by the total inlet area for all ducts associated with affected source, then multiply this number by two (2) hours; this calculated time is the minimum sample time required per test run.

(iii) Perform Method 306 testing and calculate an outlet mass emission rate.

(iv) Determine the total ventilation rate from the affected sources by using equation 1:

$$(1)\ VR_{tot}\ X\ IDA_{i}\ /\ (sum)\ IA_{total} = VR_{inlet}$$

where VR_{tot} is the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by mass of the Method 306 testing; $IDA_{i,a}$ is the total inlet duct area for all ducts conveying chromic acid from each type of affected source performing the same operation, or each type of affected source subject to the same emission limitation; IA_{total} is the sum of all nonaffected sources; and $VR_{inlet,}$ is the total ventilation rate from all inlet ducts associated with affected sources.

(v) Establish the allowable mass emission rate of the system (AMR_{sys}) in milligrams of total chromium per hour (mg/hr) using equation 2:

$$(2)\ (sum)VR_{inlet}\ X\ EL\ X\ 60\ minutes/hours = AMR_{sys}$$

where $(sum)VR_{inlet,}$ is the total ventilation rate in dscm/min from the affected sources, and EL is the applicable emission limitation from 40 CFR 63.342 in mg/dscm. The allowable mass emission rate (AMR_{sys}) calculated from equation 2 should be equal to or less than the outlet three-run average mass emission rate determined from Method 306 testing in order for the source to be in compliance with the standard.

Note B: Special compliance provisions for multiple sources controlled by a common add-on air pollution control device (that may or may not also be controlling emissions from sources not affected by these standards), and performing different types of operations (i.e., hard chromium electroplating, decorative chromium electroplating, or chromium anodizing):

(i) Calculate the cross-sectional area of each inlet duct, including those not affected by the standard.

(ii) Determine the total sample time per test run by dividing the total inlet area from all tanks connected to the control system by the total inlet area for all ducts associated with affected source, then multiply this number by 2 hours; this calculated time is the minimum sample time required per test run.

(iii) Perform Method 306 testing and calculate an outlet mass emission rate.

(iv) Determine the total ventilation rate for each type of affected source using equation 3: (3) VR_{tot} X $IDA_{i,a}$ / (sum)IA_{total} = $VR_{inlet,a}$

where VR_{tot} is the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by means of the Method 306 testing; $IDA_{i,a}$ is the total inlet duct area for all ducts conveying chromic acid from each type of affected source performing the same operation, or each type of affected source subject to the same emission limitation; IA_{total} is the sum of all duct areas from both affected and nonaffected sources; and $VR_{inlet,a,}$ is the total ventilation rate from all inlet ducts conveying chromic acid from each type of affected source performing the same operation, or each type of affected source subject to the same emission limitation.

(v) Establish the allowable mass emission rate in mg/hr for each type of affected source that is controlled by the add-on air pollution control device using equation 4, 5, 6, or 7 as appropriate:

$$(4)\ VR_{hc1} \text{ X } EL_{hcl} \text{ X } 60 \text{ minutes / hour} = AMR_{hc1}$$
$$(5)\ VR_{hc2} \text{ X } EL_{hc2} \text{ X } 60 \text{ minutes / hour} = AMR_{hc2}$$
$$(6)\ VR_{dc} \text{ X } EL_{dc} \text{ X } 60 \text{ minutes / hour} = AMR_{dc}$$
$$(7)\ VR_{ca} \text{ X } EL_{ca} \text{ X } 60 \text{ minutes / hour} = AMR_{ca}$$

where “hc” applies to the total of ventilation rates for all hard chromium electroplating tanks subject to the same emission limitation, “dc” applies to the total of ventilation rates for the decorative chromium electroplating tanks, “ca” applies to the total of ventilation rates for the chromium anodizing tanks, and EL is the applicable emission limitation from 40 CFR 63.342 in mg/dscm. There are two equations for hard chromium electroplating tanks because different emission limitations may apply (e.g., a new tank versus an existing, small tank).

(vi) Establish the allowable mass emission rate (AMR) in mg/hr for the system using the equation 8, including each type of affected source as appropriate:

$$(8)\ AMR_{hc1} + AMR_{hc2} + AMR_{dc} + AMR_{ca} = AMR_{sys}$$

The allowable mass emission rate calculated from equation 8 should be equal to or less than the outlet three-run average mass emission rate determined from Method 306 testing in order for the source to be in compliance with the standards.

Note C: Special compliance provisions for multiple sources controlled by a common add-on air pollution control device, and performing same type of operation (that may or may not also be controlling emissions from sources not affected by these standards), but are subject to different emission limitations (i.e., because one is a new hard chromium plating tank and one is an existing tank):

(i) Calculate the cross-sectional area of each inlet duct, including those not affected by the standard.

(ii) Determine the total sample time per test run by dividing the total inlet area from all tanks connected to the control system by the total inlet area for all ducts associated with affected source, then multiply this number by 2 hours; this calculated time is the minimum sample time required per test run.

(iii) Perform Method 306 testing and calculate an outlet mass emission rate.

(iv) Determine the total ventilation rate for each type of affected source using equation 3:

$$(3)\ VR_{tot}\ X\ IDA_{i,a} / (sum)IA_{total} = VR_{inlet,a}$$

where VR_{tot} is the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by means of the Method 306 testing; $IDA_{i,a}$ is the total inlet duct area for all ducts conveying chromic acid from each type of affected source performing the same operation, or each type of affected source subject to the same emission limitation; IA_{total} is the sum of all duct areas from both affected and nonaffected sources; and $VR_{inlet,a,}$ is the total ventilation rate from all inlet ducts conveying chromic acid from each type of affected source performing the same operation, or each type of affected source subject to the same emission limitation.

(v) Establish the allowable mass emission rate in mg/hr for each type of affected source that is controlled by the add-on air pollution control device using equation 4, 5, 6, or 7 as appropriate:

$$(4)\ VR_{hc1}\ X\ EL_{hcl}\ X\ 60\ minutes / hour = AMR_{hc1}$$
$$(5)\ VR_{hc2}\ X\ EL_{hc2}\ X\ 60\ minutes / hour = AMR_{hc2}$$
$$(6)\ VR_{dc}\ X\ EL_{dc}\ X\ 60\ minutes / hour = AMR_{dc}$$
$$(7)\ VR_{ca}\ X\ EL_{ca}\ X\ 60\ minutes / hour = AMR_{ca}$$

where “hc” applies to the total of ventilation rates for all hard chromium electroplating tanks subject to the same emission limitation, “dc” applies to the total of ventilation rates for the decorative chromium electroplating tanks, “ca” applies to the total of ventilation rates for the chromium anodizing tanks, and EL is the applicable emission limitation from 40 CFR 63.342 in mg/dscm. There are two equations for hard chromium electroplating tanks because different emission limitations may apply (e.g., a new tank versus an existing, small tank).

(vi) Establish the allowable mass emission rate (AMR) in mg/hr for the system using the equation 8, including each type of affected source as appropriate:

$$(8)\ AMR_{hc1} + AMR_{hc2} + AMR_{dc} + AMR_{ca} = AMR_{sys}$$

The allowable mass emission rate calculated from equation 8 should be equal to or less than the outlet three-run average mass emission rate determined from Method 306 testing in order for the source to be in compliance with the standards.

Table 1.5
Compliance Dates for Hard Chromium Electroplating, Chromium Anodizing, and Decorative Chromium Electroplating

Type of source	Source must be in compliance
Compliance Dates for Hard Chromium Electroplating	
New or reconstructed with initial startup after 12/16/93, but before 1/25/95	1/25/95 (effective date)
New or reconstructed with initial startup after 1/25/95	immediately upon startup of the source
Existing	1/25/97
Compliance Dates for Decorative Electroplating	
New or reconstructed with initial startup after 12/16/93, but before 1/25/95	1/25/95 (effective date)
New or reconstructed with initial startup after 1/25/95	immediately upon startup of the source
Existing	1/25/96
Compliance Dates for Chromium Anodizing	
New or reconstructed with initial startup after 12/16/93, but before 1/25/95	1/25/95 (effective date)
New or reconstructed with initial startup after 1/25/95	immediately upon startup of the source
Existing	1/25/97

Table 1.6
Work Practice Standards for Add-On Control Device

Control Device	Work Practice Standards	Time Required
Composite Mesh Pad (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. 2. Visually inspect back portion of the mesh pad closest to the fan to ensure there is no breakthrough of chromic acid mist. 3. Visually inspect ductwork from tank to the control device to ensure there are no leaks. 4. Perform washdown of the composite mesh pads in accordance with manufacturer's recommendations	1. 1/quarter 2. 1/quarter 3. 1/quarter 4. Per manufacturer
Packed Bed Scrubber (PBS) System	1. Visually inspect device 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. 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. 3. Same as number 3 for CMP System. 4. Add fresh makeup water to the top of the packed bed.[a,b]	1. 1/quarter 2. 1/quarter 3. 1/quarter 4. Whenever makeup is added
PBS/CMP System	1. Same as for CMP System. 2. Same as for CMP System. 3. Same as for CMP System. 4. Same as for CMP System.	1. 1/quarter 2. 1/quarter 3. 1/quarter 4. Per manufacturer
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. 2. Visually inspect ductwork from tank or tanks to the control device to ensure there are no leaks. 3. Perform washdown of fiber elements in accordance with manufacturer's recommendations.	1. 1/quarter 2. 1/quarter 3. Per manufacturer
Other air pollution control devices	To be proposed by the source for approval by the Administrator of the U.S. EPA.	To be proposed by source
Monitoring Equipment		
Pilot 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.	1/quarter
Stalagmometer[d]	Follow manufacturer's recommendations.	

[a] If greater than fifty (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.

[d] Device used to measure the surface tension of the bath.

Table 1.7
Dates By Which Operator Must Have Performed Initial Performance Test

Type of Source	Initial Startup Date	Date of Initial Performance Test
Existing hard chromium or chromium anodizing	before 12/16/95	perform test by 7/24/97
Existing decorative chromium	before 12/16/95	perform test by 7/24/96
Existing any source	after 12/16/95	perform test within 180 days after initial startup date
New or Reconstructed	after 12/16/93 and before 1/25/95	perform test by 7/24/95
New or Reconstructed	after 1/25/95	perform test within 180 days after initial startup date
Existing, New, or Reconstructed with an extension granted by APCD or U.S. EPA	at any time	perform test within 180 days after termination of extension

Table 1.8
Summary of Ongoing Monitoring Requirements

Air Pollution Control System	Monitored Parameter [a]	Monitoring Frequency
Composite Mesh Pad System	Pressure drop across system	Daily
Packet Bed Scrubber	Pressure drop across system	Daily
	Velocity pressure at system inlet	Daily
Packet Bed Scrubber / Composite Mesh Pad System	Pressure drop across the mesh-pad system	Daily
Fiber Bed Mist Eliminator	Pressure drop across the control device located upstream of the fiber bed that prevents plugging	Daily
Wetting Agent or Combination Wetting Agent / Foam Blanket Fume Suppressants	Surface tension	Daily
Foam Blanket-type Fume Suppressant	Foam blanket thickness	Every 4 hours[b,c]
Fume Suppressant / Add-on Control Device	As identified above	Every hour[c,d]

[a] Acceptable values for these monitored parameters are established during initial performance testing.

[b] If there are no exceedances of the maximum surface tension after forty (40) hours of operation, then the monitoring frequency can be decreased to once every eight (8) hours. If there are no exceedances for the next forty (40) hours, then the frequency can be decreased to once every forty (40) hours. If an exceedance occurs at any time after that, then the initial monitoring schedule (every four (4) hours) must be resumed.

[c] The initial schedule must be resumed for every new tank solution.

[d] If there are no exceedances of the minimum foam blanket thickness after forty (40) hours of operation, then the monitoring frequency can be decreased to once every four (4) hours. If there are no exceedances for the next forty (40) hours, then the frequency can be decreased to once every eight (8) hours. If an exceedance occurs after that, then the initial monitoring schedule (every hour) must be resumed.

Table 1.9
Operating Parameter Values Used for Ongoing Compliance Monitoring

Monitored Parameter	Applicable Air Pollution Control Systems	Method Used to Establish Acceptable Values
Pressure Drop	Composite Mesh Pad System Packed Bed Scrubber System Fiber Bed Mist Eliminator	The range can be: 1. The range of pressure drops measured during multiple performance tests; or 2. ± 1 inch of H_20 column about the average pressure drop measured during three compliant test runs (i.e., the source was at or below the applicable emission limit)
Velocity Pressure	Packed Bed Scrubber System	The range can be: 1. The range of velocity pressures measured during multiple performance tests; or 2. ± 10 percent about the average velocity pressure measured during three compliant test runs
Surface Tension	Wetting Agent	1. A maximum value can be established during performance testing including at least three compliant test runs; or 2. Operator can forego testing (if have decorative chromium electroplating or chromium anodizing operation) and accept 45 dynes/cm as maximum surface tension value
Foam Blanket Thickness	Foam Blanket Fume Suppressant	1. A minimum foam blanket thickness measured during at least three compliant test runs; or 2. Operator can elect to use 1 inch as the minimum foam blanket thickness

Table 1.10
Summary of Notification of Construction or Reconstruction and Initial Notification Requirements

Relevant Dates	Type of Source	Requirements
Startup date before 1/25/95	Existing	1. Submit initial notification on or before 7/24/95 (180 days after promulgation of final rule).
Startup date after 1/25/95 and construction or reconstruction commenced before 1/25/95	New or Reconstructed	1. Obtain a construction permit from APCD prior to commencing construction.[a] 2. Submit a construction schedule.[b] 3. Submit a notification of actual startup date of source within thirty (30) calendar days of startup.
Startup date after 1/25/95 and construction or reconstruction commenced after 1/25/95	New or Reconstructed	1. Obtain a construction permit from APCD prior to commencing construction.[a] 2. Submit notification of the date construction or reconstruction commenced will or did begin within thirty (30) calendar days after commencement date of construction or reconstruction. 3. Submit a notification of actual startup date of source within thirty (30) calendar days of startup.

[a] Colorado Regulation No. 3 Part B Section III.A.5.

[b] U.S. EPA requires an operator to submit a notification that an operator is constructing or reconstructing a chromium electroplating or chromium anodizing source. (40 CFR 63.345(b).) At the same time, an operator must submit a notification of the date when the construction or reconstruction was commenced. (40 CFR 63.347(c)(2)(i).)

1.2 Introduction to the Regulations Concerning Chromium Electroplating and Anodizing Tanks

The 1990 Clean Air Act Amendments established a new regime concerning the setting the emission standards for new and existing sources of hazardous air pollutants. This new regime requires the maximum degree of reduction in emissions of certain hazardous air pollutants that the Administrator of U.S. Environmental Protection Agency ("U.S. EPA") determines is achievable for new or existing sources in the category or subcategory to which the emission standard applies.[1] This regime is known as maximum achievable control technology ("MACT") standard.

Chromium electroplating and chromium anodizing (or chromic acid anodizing), are within a listed source category. Therefore, the following sections include a general description of the chromium electroplating processes and the requirements established by U.S. EPA for the several types of chromium electroplating and chromium anodizing systems.

One way the U.S. EPA and Colorado Air Pollution Control Division ("APCD") try to limit the emission of air pollutants, is to regulate "sources." U.S. EPA has defined a source in the chromium electroplating regulations to be each chromium electroplating or chromium anodizing tank at facilities which perform hard chromium electroplating, decorative chromium electroplating, or chromium anodizing.[2] The chromium electroplating or anodizing tank is the receptacle or container in which hard or decorative chromium electroplating or chromium anodizing occurs.[3]

Each source or tank is subject to an emission limitation. There are distinct emissions limitations and requirements depending on whether the source is a hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank. An emission limitation is the concentration of total chromium allowed by U.S. EPA to be emitted from a source. Emission limitations for chromium electroplating sources are expressed in milligrams per dry standard cubic meter (mg/dscm) or by the allowable surface tension expressed in dynes per centimeter (dynes/cm). Surface tension is the property that exists in the surface film of all liquids and tends to prevent liquids from spreading. Emission limitations are discussed throughout this Chapter 1.0, and are found in Tables 1.2 and 1.3.

The following symbols are used to indicate special items of interest for Inspectors.

☞	Practical tip for Inspector
✓	Practical tip for Operator
➔	Inspector responsibility
!	Warning for Inspector

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[1] CAA § 112 (d).
[2] 40 CFR 63.340 (a).
[3] 40 CFR 63.341 (a).

1.3 Chromium Electroplating in General

3.1.1 Some Basics on Chromium Electroplating

Chromium electroplating is a process by which a layer of chromium is electrodeposited on a base material. The process is used for several purposes, including to: 1) protect the base material from corrosion (chromium anodizing); 2) provide a layer of electrical insulation (chromium anodizing); 3) create a surface which provides wear resistance, a low coefficient of friction, and hardness (hard chromium electroplating); or 4) add a decorative layer onto the base material (decorative chromium electroplating).

To electroplate means to coat metal by using electrolysis. Electrolysis is the production of chemical changes by passage of an electric current through an electrolyte solution. A layer of chromium is deposited on a base metal through a chemical change created by an electric current passing through the solution. The result is a hard layer of chromium coating the base material.

An electroplating or anodizing bath is the electrolytic solution used as the conducting medium.[4] Chromium plating generates hydrogen and oxygen at the electrodes. When these small gas bubbles break the surface of the solution, small droplets of chromium from the plating bath are formed. These chromium droplets constitute hazardous air pollutants and can be removed from the air by the use of air pollution control equipment as discussed in Section 1.5 of this Chapter 1.0.

3.1.2 Types of Chromium Electroplating Sources

There are several types of electroplating systems: chromium anodizing or chromic acid anodizing, decorative chromium electroplating, large hard chromium electroplating, and small hard chromium electroplating. Each type of system has a unique set of Federal requirements an operator must comply with. In Colorado, most of the chromium electroplating sources are decorative chromium electroplating systems.

An Inspector must be able to assess what type of system is being inspected based upon the function served by the source and process parameters designated by U.S. EPA. The functions typically served by each type of chromium electroplating system are described in this Section 1.3.2 in this Chapter 1.0. Process parameters include the plating thickness, how much current is applied, and the time it takes to electroplate. See Table 1.1 for a summary of the functions and process parameters associated with the different types of electroplating facilities. If a facility's operations do not fall exactly within a definition provided in this Federal regulation, the APCD and local agency must determine which definition applies. This is another reason the Inspector must determine prior to visiting the facility site which type of chromium electroplating or anodizing sources are involved.

3.2.1.1 Chromium Anodizing or Chromic Acid Anodizing[5]

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[4] 40 CFR 63.341 (a).

[5] 40 CFR 63.341 (a).

Chromium anodizing or chromic acid anodizing is the electrolytic process by which a chromium oxide film or layer is produced on the surface of a base metal (i.e., aluminum) electrolytically. The process uses a chromic acid solution. Chromic acid is the common name for chromium anhydride (CrO_3). In chromium anodizing, the part to be anodized acts as the anode[6] in the electrical circuit, and the chromic acid solution serves as the electrolyte. The chromic acid solution typically has a concentration ranging from fifty (50) to one hundred (100) grams per liter. The result is a layer which provides corrosion resistance for aircraft parts, architectural structures, or electrical insulation. Examples of chromium anodizing products include aircraft parts, electronic parts, architectural structures, and bicycle rims.

3.2.1.2 Decorative Chromium Electroplating[7]

Decorative chromium electroplating is one action in a series of plating steps that results in a thin layer of chromium being deposited on a base material. It is the process by which a thin layer of chromium (typically 0.003 to 2.5 microns) is electrodeposited on a base metal, plastic, or undercoating to provide a bright surface with wear and tarnish resistance. Examples of decorative chromium products include auto bumpers and trim, bathroom fixtures, and tools.

There are two different types of processes available for decorative chromium electroplating facilities. The first is the use of the traditional hexavalent chromium (chromic acid) process. Chromic acid is the common name for chromium anhydride (CrO_3). The second is the use of a trivalent chromium electroplating process. The trivalent process utilizes trivalent chromium plating baths instead of a chromic acid solution. The components of the bath are called by the trade or brand names of each component and those trade or brand names can be used by operators and Inspectors in any reporting requirements. If an operator uses trivalent process and the trivalent bath has a wetting agent as an ingredient, the operator needs to comply with fewer requirements under this regulation.[8] If an operator uses a trivalent bath that does not incorporate a wetting agent as an ingredient of the bath, the operator must comply with the requirements as if a hexavalent process was used.[9] If an operator had been using a trivalent bath with a wetting agent as an ingredient of the bath and then stops using this type of bath, the operator must comply with the emission limits for a hexavalent process within one year and must comply with all other requirements immediately.[10] If an operator uses a hexavalent bath, the operator cannot avoid any requirements by changing the form of the chromium from hexavalent to trivalent.[11] Instead, the operator must switch to a trivalent bath that incorporates a wetting agent as an ingredient.

Operators may be interested in learning more about the trivalent process, because it is very effective in reducing chromium emissions in chromium electroplating operations and use of such a process can eliminate certain requirements under this regulation. The advantages for an operator to use the trivalent process, include:

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[6] An anode is a positive electrode. It is the point of exit of electrons from a device to the external circuit.

[7] 40 CFR 63.341 (a).

[8] 40 CFR 63.342 (e)(1).

[9] 40 CFR 63.342 (e)(2).

[10] 40 CFR 63.342 (e)(3).

[11] 40 CFR 63.342 (g).

1) lower toxicity than hexavalent chromium;
2) reduced waste disposal problems and costs compared to use of hexavalent chromium;
3) providing better covering and throwing power than hexavalent chromium;
4) eliminating "burning"; and
5) providing enhanced corrosion resistance compared to hexavalent chromium.

However, there are disadvantages in using a trivalent process, including:

1) careful rinsing is required to minimize bath contamination;
2) the finish of satin nickel may appear more gray than blue; and
3) post treatment may be required to neutralize unplated areas for corrosion resistance.

Most of these problems or disadvantages can be overcome with process adjustments, such as careful rinsing to minimize bath contamination. The use of a trivalent chromium process is considered a pollution prevention measure as defined in Section 1.7 of this Chapter 1.0.

3.2.1.3 Hard Chromium Electroplating

Hard chromium electroplating is also known as industrial chromium electroplating. This is a process by which a thick layer of chromium is deposited on a base material. This thick layer of chromium creates a surface on the base material for functional purposes. For example, the surface provides wear resistance, a low coefficient of friction, hardness, and corrosion resistance. Examples of hard chromium electroplating products are hydraulic cylinders and industrial rolls. There are both large and small hard chromium electroplating facilities and the large facilities are sometimes subject to more stringent requirements.

A large, hard chromium electroplating facility[12] is a facility that performs hard chromium electroplating and has a maximum cumulative potential rectifier capacity greater than or equal to sixty (60) million ampere hours per year. A small, hard chromium electroplating facility[13] is a facility that performs hard chromium electroplating and has a maximum cumulative potential rectifier capacity less than sixty (60) million ampere hours per year. A "rectifier" is a device that converts alternating current into direct current by permitting a considerable flow of current in one direction.

"Maximum cumulative potential rectifier capacity"[14] is the summation of the total installed rectifier capacity of the hard chromium electroplating tanks at a facility. The capacity is expressed in amperes, multiplied by the maximum potential operating schedule of eight thousand and four hundred (8,400) hours per year, multiplied by 0.7 (which assumes that electrodes are energized seventy percent [70%] of the total operating time). The maximum potential operating schedule is based upon operating twenty four (24) hours per day, seven (7) days per week, and fifty (50) weeks per year. For example, to calculate the annual maximum cumulative potential rectifier capacity for a facility, add the total installed rectifier capacities associated with all the hard chromium tanks (C_R) and multiply this sum by eight thousand and four hundred (8,400) hours per year and seventy percent (0.7) as shown in this equation:

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[12] 40 CFR 63.341 (a).
[13] 40 CFR 63.341 (a).
[14] 40 CFR 63.341 (a).

(Add total facility C_R from all tanks) x 8,400 x 0.7 = ampere hours / year

An Inspector can request the operator provide proof of the rectifier capacity for each tank. The operator should keep documentation of the rectifier capacity in the recordkeeping system for the source. If the operator does not know the rectifier capacity, the operator should contact the manufacturer or sales and distribution company from which the system was purchased and request that information.

The size of a hard chromium electroplating facility is based upon the hard chromium capacity within the boundaries of the entire facility. For example, a facility with both hard chromium and chromium anodizing tanks attached to the same control device would only consider the rectifier capacity associated with the hard chromium tanks in determining the size (large or small) of the facility. However, a facility with several hard chromium tanks attached to a control device in one building and several other hard chromium tanks attached to a control device in a different building, must consider the total capacity of all the tanks in determining size. This is because the size must be determined for all hard chromium tanks within the boundaries of the facility.

An operator would prefer to be considered a small facility and be subject to less stringent requirements. U.S. EPA provides operators with two alternative methods to prove the facility is actually a small facility if a source has a maximum rectifier capacity of sixty (60) million ampere hours per year or more. Specifically, an operator of a facility with a maximum capacity of sixty (60) million ampere hours per year or more may be considered "small" if the operator can prove that the **actual** total rectifier capacity is less than sixty (60) million ampere hours per year using one of the following methods:

1) the operator maintains records showing that the facility's previous annual actual rectifier capacity was less than sixty (60) million ampere hours per year; this can be shown by using nonresettable ampere hour meters and keeping monthly records of actual ampere hour usage one a twelve (12) month rolling basis (this month plus the last eleven [11] months) following the compliance date; **or**

2) the operator accepts a federally enforceable limit on the maximum cumulative rectifier capacity of a hard chromium electroplating facility through its Title V Operating Permit and maintains monthly records to demonstrate that the federally enforceable limit has not been exceeded for a twelve (12) month rolling basis (this month plus the last eleven [11] months).[15]

For either method of determining the size of a hard chromium electroplating facility, the actual cumulative rectifier capacity for the previous twelve (12) month rolling period shall be tabulated monthly by adding the capacity for the current month to the capacities for the previous eleven (11) months.[16] The operator can comply with the requirements for a small, hard chromium facility immediately after the operator demonstrates the facility is a small, hard chromium facility. However, until the operator can demonstrate it is a small, hard chromium facility, the operator must comply with the requirements for a large, hard chromium facility.

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[15] 40 CFR 63.342 (c)(2)(i)(A) and (B).

[16] 40 CFR 63.342 (c)(2)(i)(A) and (B).

If an existing hard chromium electroplating tank(s) located at a small, hard chromium electroplating facility increases its maximum total potential rectifier capacity or its actual cumulative rectifier capacity to greater than or equal to sixty (60) million ampere hours per year, the source becomes a large, hard chromium electroplating facility. The operator must comply with the requirements for large, hard chromium electroplating facilities no later than one (1) year after the month in which the monthly records show that the large designation is met or by January 25, 1997, whichever is later.[17]

3.2.1.4 Other Tanks

If a facility's operations do not fall exactly within the function(s) and parameters of one of the types of chromium electroplating or anodizing sources, the Inspector and APCD must determine which type it will be considered. The operator is required to contact the APCD or local regulatory agency and request that the APCD or local agency determine which source type applies to the facility. To make such a determination the APCD and Inspector can consider a number of factors including the: purpose for which the chrome is being applied, whether a hexavalent or trivalent solution is used, plate thickness, plating time, plate density, chromic acid concentrations, whether sulfuric acid is used, and temperature of the solution. The Inspector and APCD should determine together whether the facility is a hard chromium electroplating, decorative chromium electroplating, or chromium anodizing source.

3.2.1.5 Exempt Tanks

The Federal regulation specifically exempts certain types of sources. Therefore, the following describes the tanks or operations that do not need to comply with the Federal requirements discussed in this Chapter 1.0.

Research or laboratory operations are exempt.[18] For an operation to be exempt as a research or laboratory operation, the operator must show that:

1) it is an operation which has a primary purpose of research and development of new processes and products;
2) the operations are conducted under the close supervision of technically trained personnel; and
3) the operation is not involved in the manufacture of products for commercial sale, except in a de minimis or minor manner.[19]

Operations which meet these requirements are exempt from these regulations.[20]

Certain tanks associated with a chromium electroplating or anodizing process are exempt. Process tanks in which neither chromium electroplating nor chromium anodizing is taking place, are not subject to these Federal regulations, for example, rinse tanks, etching tanks, reverse stripping tanks, and cleaning tanks.[21] Finally, tanks that contain a chromium solution, but in which no electrolytic process occurs (i.e., chrome conversion coating tank where no electrical current is applied) are exempt

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[17] 40 CFR 63.342 (a)(5).

[18] 40 CFR 63.340 (d).

[19] 40 CFR 63.341 (a).

[20] 40 CFR 63.340 (d).

[21] 40 CFR 63.340 (c).

from these regulations.[22]

1.4 Categories of Sources

Federal regulation of hazardous air pollutants is based on differentiating between types of sources. There are “new sources,” “reconstructed sources,” “existing sources,” “major sources,” and “area or minor sources.” Therefore, both the size of the source and when the source was built determines how these Federal requirements apply to a chromium electroplating system.

4.1.1 New, Reconstructed, and Existing Sources

Whether a source is new, reconstructed, or existing determines when the operator must be in compliance with this Federal regulation and which requirements apply. Newly constructed sources and reconstructed sources (sometimes referred to as modified sources) are both considered “new sources.” The emission limits for existing sources are less stringent than for new or reconstructed sources. The reason for the difference is the belief that installing the “best” control systems at new or reconstructed sources is often considerably cheaper than installing the same system at an existing source. See Table 1.5 for a summary of the specific dates by which new, reconstructed, and existing chromium electroplating and anodizing sources must be in compliance with this Federal regulation.

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[22] 40 CFR 63.340 (c).

4.1.1.1 New Sources[23]

A “new source” is a source for which construction or reconstruction began after U.S. EPA first proposed a relevant emission standard. U.S. EPA has created two different categories of new sources. Both categories relate to the initial startup date of the source. The initial startup date is the day the tank goes on-line for use in the manufacturing operations. This does not include the period of time before it is used in manufacturing when the tank is being tested.

The first type of new source is a source that has an initial startup date after the emission standard was proposed, but before the emission standard received final approval (“was approved”). Chromium electroplating and chromium anodizing sources that were newly constructed or reconstructed with an initial startup after December 16, 1993 (date emission standard was proposed), but before January 25, 1995 (date emission standard was approved), are the first type of new sources.[24]

The second type of new source is a source that has an initial startup date after January 25, 1995.[25] The two types of new sources are relevant in determining when a source must comply with these requirements which is discussed throughout Section 1.6 of this Chapter 1.0.

4.1.1.2 Reconstructed Sources

A “reconstructed source” is if there is a major physical change in a facility so as to virtually replace it or substantially increase its capacity. For chromium electroplating, it is the replacement of tank components, which were replaced to an extent that the fixed capital cost of the new components exceeded fifty percent (50%) of the fixed capital cost that would be required to construct a comparable new source. In addition, it must be technologically and economically feasible for the tank to meet the requirements of the final rule. Reconstruction must have began after December 16, 1993 (when U.S. EPA first proposed the standard). A reconstructed source must meet all applicable requirements for new sources.

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[23] 40 CFR 63.2.

[24] 40 CFR 63.343 (2).

[25] 40 CFR 63.343 (2).

4.1.1.3 Existing Source[26]

An "existing source" is any affected source which is not a new source. Therefore, an existing source is any chromium electroplating or chromium anodizing tank which was constructed and began operating prior to December 16, 1993.

4.1.2 Size of Sources

The difference between a major and an area or minor source is based on the source's potential to emit hazardous air pollutants. The State defines "potential to emit" as the maximum capacity of a stationary source to emit a pollutant under its physical and operational design.[27] Any physical or operational restriction on the capacity of a source to emit a pollutant shall be treated as part of its design if the limitation or the effect it would have on emissions can be practically enforced and is legally enforceable. In other words, the potential to emit of a source (tank) is the most chrome a chromium electroplating tank can emit considering the: air pollution control equipment, legal and practical restrictions on hours of operation, and restrictions on the amount or type of material combusted, stored, or processed. Other restrictions or limitations can also be considered and may be included in the operating or construction permit for the source.

Secondary emissions are not included in determining the potential to emit of a source. Secondary emissions are air pollutant emissions which happen as a result of the construction or operations of a major source, but do not come from the major source itself.[28] For example, secondary emissions are emissions from an offsite facility that supports a major source and would not have been built except for the major source facility.

Most chromium electroplating sources in the United States are independent job shops and fall within the definition of an area source. This determination of whether a source is major or area is separate from determining whether a hard chromium electroplating facility is "large" or "small."

4.2.1.1 Major Source[29]

A major source can be any stationary source or group of stationary sources which meets the following requirements:

1) is located within a contiguous area;
2) is under common control ("common control" means the tank is controlled through air pollution equipment or controlled by the same owner or operator under along with other tanks or sources governed by this regulation); **and**
3) it emits or has the potential to emit ten (10) tons per year or more of any one type of hazardous air pollutant; **or**
4) it emits or has the potential to emit twenty five (25) tons per year or more of any combination of hazardous air pollutants (i.e., chromium and methylene chloride).

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[26] 40 CFR 63.2.

[27] 5 CCR 1001-1, Common Provisions I.G. Potential to Emit.

[28] 5 CCR 1001-1, Common Provisions I.G. Secondary Emissions.

[29] 40 CFR 63.2.

The following are examples of a major source under the Federal regulations.

1) A hard chromium electroplating facility which has one tank in one building, two tanks in another building, are under common control, and the tanks combined have the potential to emit 10.5 tons per year.

2) A chromium electroplating facility with one hard chromium electroplating tank with a potential to emit seven (7) tons per year and one decorative chromium electroplating tank with a potential to emit four (4) tons per year.

3) A decorative chromium electroplating facility with two tanks in one building under common control and together have the potential to emit nine (9) tons per year, and a surface coating operation for metal parts which has the potential to emit seventeen (17) tons per year of methylene chloride.

4.2.1.2 Area Source[30]

In order to regulate the many "minor" facilities that emit harmful quantities of pollutants that may cause damage in surprisingly small quantities, U.S. EPA developed a regulatory program encompassing "minor" facilities and termed them "area sources." An area source is any stationary source of air pollutants that is not a major source. Therefore, if a source has a potential to emit less than ten (10) tons per year of any one type of hazardous air pollutant, then that source is considered an area source. If a source has the potential to emit less than twenty five (25) tons per year of any combination of hazardous air pollutants (i.e., chromium and methylene chloride), then that source is also considered an area source.

If the actual or potential emissions of hazardous air pollutants of an **existing** area source increase such that the area source becomes a major source, the operator must comply with the provisions for existing major sources. Thus, if the potential of a chromium electroplating or chromium anodizing area source to emit chromium increases so that the potential to emit is ten (10) tons per year or more of chromium or twenty five (25) tons per year or more of chromium plus other listed hazardous air pollutants, then the source becomes a major source and the operator of the source must comply with the requirements for a major source immediately.[31] The requirements of a major source attach immediately upon the source becoming a major source. The requirements for area chromium electroplating and chromium anodizing sources differ in that area sources are not required to obtain a Title V Operating Permit and required to submit annual instead of semiannual ongoing compliance reports (discussed in Section 1.6.7.4 of this Chapter 1.0).

If the actual or potential emissions of hazardous air pollutants of a **new** area source increase such that the area source becomes a major source, the operator must comply with the provisions for new major sources. The requirements attach immediately upon the source becoming a major source.

1.5 Air Pollution Control Techniques

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[30] 40 CFR 63.2 and 63.343 (a)(3), (4).

[31] 40 CFR 63.343 (a)(3) and (4).

An air pollution control technique is any method that is used to reduce chromium emissions from chromium electroplating and chromium anodizing tanks.[32] The two types of air pollution control techniques utilized to reduce chromium emissions from electroplating and anodizing systems are add-on air pollution control devices and chemical fume suppressants.[33] An add-on pollution control device is equipment that is installed in the ventilation system of electroplating sources to collect and hold chromium emissions from the tanks. A chemical fume suppressant is any chemical agent used to reduce or suppress fumes or mists at the surface of an electroplating or anodizing bath.

The control technique used determines the requirements with which a source must comply. Specifically, the emission limits of a facility are based on the level of control that can be maintained using a certain control technique. The method used to establish an operating parameter value also depends upon the air pollution control device utilized. In addition, the type of air pollution control device a source utilizes affects what parameters are used for compliance monitoring and the frequency of compliance monitoring. The type of control device can also affect the type of work practice requirements an operator must carry out. Therefore, an Inspector must determine which control device is on the source(s).

U.S. EPA looks to certain air pollution control devices commonly used for chromium facilities as the basis for the emission limits. However, an operator may choose to use another control technique, as long as the operator can show that it meets the emission limit for that type of facility. The operator does not need to obtain U.S. EPA approval to choose another technique. However, U.S. EPA approval is required on the monitoring parameters and test methods that an operator will use. If another control technique is utilized at a facility, the Inspector should ask the operator if the operator received a copy of a letter from the U.S. EPA to the air pollution control system manufacturer, approving a non-listed control technique. If the operator has received this approval letter, the Inspector should review and ensure the approved control technique is being used.

U.S. EPA recognizes certain typical control efficiencies for each type of control device. However, the Inspector and the operator must be aware that actual performance levels may vary from these typical values, depending upon such factor as the inlet conditions and how well the control devices are operated and maintained.

5.1.1 Add-on Air Pollution Control Devices

An add-on air pollution control device means equipment is installed in the ventilation system of chromium electroplating and anodizing tanks for the purposes of collecting and holding chromium emissions from the tank(s).[34] For example, scrubbers remove droplets in the exhaust system. Add-on control devices include the following three systems.

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[32] 40 CFR 63.341 (a).

[33] 40 CFR 63.341 (a).

[34] 40 CFR 63.341 (a).

5.1.1.1 Composite Mesh Pad System ("CMP")[35,36]

A CMP typically consists of several layers of interlocked fibers densely packed between two supporting grids. The composite mesh pad was developed to remove small particles (< 5 µm or 0.2 mils) that were not effectively controlled by other control devices. There are usually at least three mesh pad stages. The first stage removes large particles. The second stage removes smaller particles using a composite mesh pad. The final stage may remove any reentrained particles not collected by the composite mesh pad in the second stage. A reentrained particle is a particle which was caught by the mesh pad, but some force removed it from the mesh pad and returned it to the air stream.

The layers of material in composite pads are arranged with the smallest diameter fiber layer located in the center of the pad and progressively larger diameter layers located on both sides of the center. Particles collide with the fibers in the pad and attach to the fiber surfaces. These captured particles combine into larger drops as they travel through the small diameter fiber layers in the center of the pad. These larger particles either drain to the bottom of the unit or are reentrained in the gas stream. The reentrained particles are then captured by the large diameter fiber layers in the back of the pad.

CMP systems incorporate a larger particle removal system located upstream from the composite mesh pad, to reduce the plugging potential of the pad. The large particle removal system can either be a series of larger diameter mesh pads or a packed bed scrubber section. Typical removal efficiencies associated with this control device are greater than ninety nine percent (99%).

5.1.1.2 Fiber Bed Mist Eliminator ("FBME")[37,38]

An FBME removes contaminants from a gas stream through the mechanisms of inertial impaction and Brownian diffusion. FBMEs have most often been used to reduce acid mists from sulfuric, phosphoric, and nitric acid plants. An FBME consists of one or more fiber beds and each bed consists of a hollow cylinder formed from two concentric screens. The fiber between the screens may be made of glass, ceramic plastic, or metal. Fiber bed units are designed for horizontal, concurrent gas liquid flow through the fiber bed. The contaminated gas stream flows toward the downstream face of the bed. The acid mist in the gas stream impacts on the surface of the fibers and drains down the outer face of the bed to the sump while the clean gas flows up and out the top of the unit.

An FBME device is typically installed downstream from another control device that can prevent plugging of the FBME device. The upstream device removes the majority of the emissions and thus prevents plugging of the fiber bed.

To date, there is no adequate test data available to accurately quantify the control efficiency of FBME. However, U.S. EPA believes that these systems can achieve the same emission limits as CMP systems and chemical fume suppressants.

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[35] 40 CFR 63.341 (a).

[36] See Figure 1.1 of this Chapter 1.0 for schematic diagram of a CMP.

[37] 40 CFR 63.341 (a).

[38] See Figure 1.2 of this Chapter 1.0 for schematic diagram of a FBME.

5.1.1.3 Packed Bed Scrubber ("PBS")[39,40]

A PBS consists of a single or double packed bed that contains material onto which the chromic acid drops attach. The packed bed section of the scrubber is followed by a mist eliminator to remove any water entrained from the packed bed section. A PBS is typically used to reduce emissions of chromic acid mist from electroplating and anodizing tanks. Chromic acid mist is removed from the gas stream primarily by drops of the mist attaching onto the packing media. First, the gas stream is wetted by spraying water against the flow of the gas to make the drops larger. Then the gas stream passes through the packed bed(s) where the drops attach onto the packing media. The regulation requires periodic washing of packing material using an overhead weir.

Usually, the packed bed section of the scrubber is followed by a mist eliminator section comprised of a single chevron blade mist eliminator. The mist eliminator removes any water entrained from the packed bed section. Treated gases then pass through an induced draft fan and out a stack of exhaust vent. The scrubber water is usually recirculated and periodically tapped and discharged to the electroplating tanks as makeup solution.

A PBS has a typical efficiency of ninety seven percent (97%) for decorative chromium electroplating and anodizing tanks and ninety nine percent (99%) for hard chromium electroplating tanks. An Inspector should ensure that the operator is aware of such efficiency rates in calculating estimated emission limits.

5.1.1.4 Packed Bed Scrubber and Composite Mesh Pad System ("PBS/CMP")

A combination of the PBS system and the CMP system.

5.1.2 Chemical Fume Suppressant

A chemical fume suppressant is any chemical agent that reduces or suppresses fumes or mists at the surface of an electroplating or anodizing bath or solution.[41] Another term for chemical fume suppressant is mist suppressant.[42] Surface tension means the property that exists in the surface film of all liquids and tends to prevent liquid from spreading.[43] In other words, it is the property of a liquid in contact with air or vapor that makes it behave as if it were covered with a thin membrane under tension. For example, if you were to fill a glass of water and carefully place a thin razor blade onto the top of the water, it would float for a short time due to this pseudo-membrane that supports it. This "tension" at the surface results from intermolecular forces within the solution that cause the exposed surface to contract to the smallest possible area. The property of surface tension is responsible for the formation of liquid droplets, soap bubbles, and menisci (the curved upward or downward appearance of a column of liquid). See Section 1.6.5 and Addendum C of this Chapter 1.0 for specifics on measurement of surface tension.

Chemical fume suppressants are added directly to the bath to reduce or inhibit misting and include: wetting agents, foam blankets, and combinations that include both a wetting agent and a foam

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[39] 40 CFR 63.341 (a).

[40] See Figures 1.3, 1.4, and 1.5 of this Chapter 1.0 for schematic diagram of a PBS.

[41] 40 CFR 63.341 (a).

[42] 40 CFR 63.341 (a).

[43] 40 CFR 63.341 (a).

blanket. An important distinction between wetting agents and foam blankets is how they reduce emissions, which is illustrated in this Section 1.5.2.

For an operator there are advantages and disadvantages to using a chemical fume suppressant. Chemical fume suppressants are used widely and effectively in decorative chromium electroplating and chromic acid anodizing operations. Chemical fume suppressants are used less frequently in hard chromium electroplating operations. The disadvantages for an operator of using a chemical fume suppressant include:

1) some wetting agents have a tendency to aggravate pitting; and
2) foam blankets that are too thick entrap hydrogen gas, which poses a risk of explosion.

The advantages include:

1) minimization of plating solution evaporation losses;
2) a very low cost of chromium emission control;
3) no impact on energy consumption; and
4) no impact on solid waste generation.

Finally, chemical fume suppressants typically reduce chromium emissions by more than ninety nine percent (99%).

5.2.1.1 Foam Blanket[44]

A foam blanket is the type of chemical fume suppressant that generates a layer of foam across the surface of a solution when current is applied to that solution. Foam blankets do not prevent the formation of chromic acid mist, but instead trap the mist (hydrogen and water) formed under a blanket of foam. The foam blanket is formed by agitation produced by the hydrogen and oxygen gas bubbles generated during electroplating. Once formed, the foam blanket is usually maintained at a thickness of 1.3 to 2.5 cm (0.5 to 1.0 in.) and covers the entire surface of the bath. An Inspector should make sure that the foam blanket is not too thick (>5 cm), because it collects the hydrogen gas and with the electrical currents being used it can cause a reaction (explosion). Also, the foam blanket should not be too thin (<1.3 cm), because it will no longer trap the chrome.

5.2.1.2 Wetting Agent[45]

A wetting agent is the type of chemical fume suppressant that reduces the surface tension of a liquid. Wetting agents reduce or inhibit misting by lowering the surface tension of the bath. When the surface tension of the solution is reduced, gases escape at the surface of the solution with less of a "bursting" effect. Thus, less mist is formed. Another explanation is that a wetting agent reduces the surface tension and creates smaller bubbles, and when the smaller bubbles burst there is less impact.

There are several methods used to test the surface tension: the ring method and the drop weight method. These methods are discussed in detail in Section 1.6.5 and Addendum C of this Chapter 1.0.

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[44] 40 CFR 63.341 (a).
[45] 40 CFR 63.341 (a).

5.1.3 Add-on Air Pollution Control Device and Chemical Fume Suppressant

Sources can also utilize a combination of an add-on control device and a chemical fume suppressant. The use of a foam blanket alone is not as effective as the use of a wetting agent and a foam blanket.

1.6 Requirements for Major and Area Sources[46]

The requirements for major chromium electroplating or chromium anodizing tanks are to: obtain an Title V Operating Permit, comply with applicable emission limits, comply with applicable work practices, do an initial performance testing, carry out ongoing compliance monitoring, establish and maintain a system for recordkeeping, and comply with the applicable records requirements.

The requirements for area chromium electroplating or chromium anodizing tanks are to: comply with applicable emission limits, comply with applicable work practices, do an initial performance testing, carry out ongoing compliance monitoring, establish and maintain a system for recordkeeping, and comply with the applicable records requirements. Area sources have a different requirement for ongoing compliance reporting and are not required to obtain a Title V Operating Permit at this time.

The standards discussed below that apply to chromic acid baths cannot be met by using a reducing agent to change the form of chromium from hexavalent to trivalent.[47]

6.1.1 Operating Permit

The Federal Clean Air Act, Title V,[48] requires that operators obtain operating permits. Operators of major chromium electroplating or chromium anodizing tanks are required to obtain a Title V Operating Permit from the APCD.[49] The State elected to defer the requirement of a Title V Operating permit for area sources. Thus, an Inspector should determine whether an Operating Permit has been applied for, and if not, detail the reasons why or why not.

6.1.2 Emission Limits and Compliance Dates

6.2.1.1 Emission Limits

The regulation specifies emission limits expressed as a concentration of chromium in milligrams per dry standard cubic meter (mg/dscm) of exhaust air or maintaining a surface tension that does not exceed forty five (45) dynes per centimeter. The emission limits are based on the use of certain control techniques, however, an operator can use another control technique as long as the operator can show that the level of control is the same or better and that U.S. EPA gave approval of the alternative technique. The emission limits apply during periods of startup, tank operation, and shutdown only. The emission limitations do not apply during periods of malfunction (but, see Section 1.6.3 concerning operation and maintenance requirements during malfunctions).

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[46] See Table 1.1 for a summary of all requirements.

[47] 40 CFR 63.342 (g).

[48] CAA 501, et seq.

[49] 40 CFR 63.340 (e).

An operator of a chromium electroplating or chromium anodizing tank must comply with the emission limitations, regardless of the air pollution control device used. See Table 1.3 to determine the required emission limit. However, decorative chromium sources are more complicated. If an operator uses a hexavalent solution or uses a hexavalent solution plus a chemical fume suppressant that contains a wetting agent, the source is subject to either an emission limit or to maintaining a certain surface tension, respectively.[50] If an operator uses a trivalent solution without a wetting agent as an ingredient in the trivalent bath or uses such a trivalent solution plus a chemical fume suppressant that contains a wetting agent, the source is subject to either an emission limit or surface tension restriction.[51] If an operator uses a trivalent solution that has a wetting agent as an ingredient of the trivalent bath, the source is subject to no emission limit.[52] This is one advantage for operators that use a trivalent solution. If an operator had been using a trivalent solution with a wetting agent as an ingredient and stops using it, the operator must comply with the emission limitations discussed for sources using a hexavalent solution.[53]

Typically, there are a group of tanks at a facility and this can create a variety of scenarios an Inspector must be prepared to analyze. There are several elements that will affect what emission limit must be met by the source. The tanks may have a common add-on air pollution control device. The various tanks may not be required to meet the same emission limits. For example, if a tank is an “existing source” and another is a “new source” there may be different requirements. In addition, the several tanks may be performing different operations. Finally, the common add-on air pollution control device may also control a source which is unaffected by the regulations governing chromium electroplating facilities.

Therefore, if there is a group of tanks with a common add-on pollution control device and any one of the tanks is operating, the Inspector should look to Table 1.4 in this Chapter 1.0. The Inspector should spend a few moments reading Table 1.4. It is organized by the various elements that may exist and will affect what emission limit must be met by the source. The following is a textual illustration of the different scenarios, however, it is also captured by Table 1.4.

1) A group of tanks with a common add-on air pollution control device, with any one of the tanks operating, performing the same type of operation (i.e., hard chromium electroplating), subject to the same emission limitation, and the common add-on air pollution control device is not controlling any nonaffected sources. The resulting emission limit requirement for multiple existing, reconstructed, or new hard chromium electroplating tanks is to control the chromium emissions discharged so the emissions do not exceed 0.015 mg/dscm or 0.03 mg/dscm if it is an existing source at small, hard chromium electroplating facility. The emission limit requirement for multiple existing, reconstructed, or new decorative chromium tanks using a hexavalent (chromic acid) solution or a trivalent solution without a wetting agent as an ingredient is 0.01 mg/dscm or a surface tension not exceeding forty five (45) dynes per centimeter. There is no emission limit requirement for multiple existing, reconstructed, or new decorative chromium tanks using a trivalent solution with a wetting agent as an ingredient. The emission limit requirement for multiple existing, reconstructed, or new chromium anodizing facility is 0.01 mg/dscm or a surface tension not exceeding forty

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[50] 40 CFR 63.342 (d); see Table 1.4.

[51] 40 CFR 63.342 (e)(2); see Table 1.4.

[52] 40 CFR 63.342 (e)(1); see Table 1.4.

[53] 40 CFR 63.342 (e)(3).

five (45) dynes per centimeter.

2) A group of tanks with a common add-on air pollution control device, with any one of the tanks operating, performing the same type of operation, subject to the same emission limitation, and the common add-on air pollution control device is controlling nonaffected sources. The resulting emission limit requirement is determined by making several calculations as defined in Table 1.4 Note A (40 CFR 63.344(e)(3)).

3) A group of tanks with a common add-on air pollution control device, with any one of the tanks operating, performing different types of operations, subject to the same emission limits, and the common add-on air pollution control device may or may not be controlling nonaffected sources. The resulting emission limit requirement is determined by making several calculations as defined in Table 1.4 Note B (40 CFR 63.344(e)(4)).

4) A group of tanks with a common add-on air pollution control device, with any one of the tanks operating, performing the same type of operation, are subject to different emission limits, and the common add-on air pollution control device may or may not be controlling nonaffected sources. The resulting emission limit requirement is determined by making several calculations as defined in Table 1.4 Note C (40 CFR 63.344(e)(4)).

6.2.1.2 Compliance Dates

Existing decorative chromium electroplating sources must be in compliance with the regulation by January 25, 1996.[54] Existing hard chromium electroplating and chromium anodizing sources must be in compliance with the regulation by January 25, 1997.[55] All new sources with an initial startup date after December 16, 1993, but before January 25, 1995, must be in compliance by January 25, 1995.[56] All new sources with an initial startup date after January 25, 1995 must be in compliance immediately upon startup.[57] See Table 1.5 for a summary of compliance dates. An Inspector should review a copy of the initial performance test kept by the operator to determine whether the source was in compliance by the required date. The Inspector may also contact APCD and ask whether APCD has determined whether this source was in compliance by the required date.

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[54] 40 CFR 63.343 (a)(1)(i).

[55] 40 CFR 63.343 (a)(1)(ii).

[56] 40 CFR 63.343 (a)(2).

[57] 40 CFR 63.343 (a)(2).

An operator of an affected source(s) may request the State to grant an extension of compliance.[58] Only one request may be submitted for all affected sources at the facility for which an extension is desired. An extension for up to one (1) additional year to comply with the required standard may be granted upon request. If an operator requests an extension and is required to obtain a Title V Operating Permit, the operator shall apply to have the Title V Operating Permit revised to incorporate the conditions of the extension of the compliance. Any request for an extension must be submitted to the APCD no later than six (6) months before the affected source's compliance date. The request for an extension of time to comply must have been received by U.S. EPA and APCD no later than July 25, 1995 for decorative chromium electroplating sources, and no later than July 25, 1996 for hard chromium and chromium anodizing sources.[59]

6.1.3 Operation and Maintenance or Work Practice Standards[60]

The Federal regulation specifies work practice standards to ensure that air pollution control systems are being properly maintained and operated. Poor maintenance could result in system degradation over time, and eventually lead to an increase in emissions. Work practice standards vary depending upon which control device is utilized and the type of facility (i.e., hard chromium electroplating, decorative chromium electroplating, or chromium anodizing). Decorative chromium electroplating sources that use a trivalent chromium bath that incorporates a wetting agent as a bath ingredient do not need to comply with the following work practice standards. Decorative chromium electroplating sources that did use a trivalent solution with a wetting agent as an ingredient, but no longer do so must begin to comply with the following standards and requirements immediately.

The work practice standards require that most facilities develop an operation and maintenance ("O&M") plan for the facility and operate and maintain the tanks in compliance with the O&M plan. Additional work practice requirements include quarterly inspections of control devices, ductwork, and monitoring equipment, periodic washdown of composite mesh pad systems, and fresh water additions to the top of packed bed scrubbers. See Table 1.6 for the specific work practice standards required for each add-on air pollution control and monitoring device. Also, an operator must ensure that malfunctions are corrected as soon as practicable after the occurrence in accordance with the O&M plan.[61] The requirements are the same for the affected hard chromium electroplating facilities, decorative chromium facilities, and anodizing tanks.

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[58] 40 CFR 63.6 (i) and 63.343 (a)(6).
[59] 40 CFR 63.343 (a)(6)(ii).
[60] 40 CFR 63.342 (f)(3).
[61] 40 CFR 63.342(f)(1)(ii).

An operator shall prepare an O&M plan to be implemented no later than the compliance date for that facility.[62] However, this O&M plan need not be submitted to U.S. EPA or APCD. An O&M plan must be incorporated by reference into the source's Title V Operating Permit.[63] The O&M plan shall include:

1) descriptions of the:
    a) operation and maintenance requirements for the affected source,
    b) add-on air pollution control device (if used to comply with the emission requirements), and
    c) process and control system monitoring equipment;
2) a standardized checklist to document the operation and maintenance of the equipment listed in 1) above to keep such equipment in proper condition;
3) incorporation of the work practice standards for that device or monitoring equipment as identified in Table 1.6, for sources using an add-on air pollution control device or monitoring equipment to comply with the emission requirements;
4) incorporation of proposed work practice standards which shall be submitted to the APCD through the Inspector, if the specific control equipment used is not identified in Table 1.6;
5) procedures to be followed to prevent equipment or process malfunctions due to poor maintenance or other preventable conditions; **and**

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[62] 40 CFR 63.343 (f)(3)(i).

[63] 40 CFR 63.343 (f)(3)(i).

6) a procedure to identify malfunctions of process equipment, add-on air pollution control devices, and process and control system monitoring equipment and for implementing corrective actions to address such malfunctions.[64]

An operator may use any standard operating procedure ("SOP") manuals, vendor O&M manuals, Occupational Safety and Health Administration ("OSHA") plans, U.S. EPA guidance manuals, or other existing plans as part of the O&M plan, as long as such materials meet the criteria in the regulation.[65] In addition, any Federal O&M plan requirements are enforceable independent of the emission limitations or other requirements. Thus, an Inspector can issue an Notice of Violation ("NOV") if an operator fails to comply with any work practice standard or does not have an O&M plan.

Operators are required to operate and maintain affected sources and associated control devices and monitoring equipment in a manner consistent with the O&M plan and "good air pollution control practices" at all times including periods of startup, shutdown, and malfunction.[66] Whether good air pollution control practices are being used may be determined on the basis of any information available to the APCD. An Inspector should request documentation to establish whether an operator is properly maintaining the facility. This documentation can include:

1) monitoring results;
2) review of the operation and maintenance plan, procedures, and records; and
3) inspection of the source.[67]

The Inspector, APCD, or U.S. EPA should determine whether the O&M plan meets the necessary requirements. If the O&M plan does not meet the requirements, the Inspector, APCD, or U.S. EPA may require that the operator make changes to the O&M plan to bring the plan into compliance and/or issue an NOV. The Inspector should require changes be made to the plan if the plan:

1) does not address a malfunction that has occurred;
2) fails to provide for the operation of the affected source, the air pollution control techniques, or the control system and process monitoring equipment during a malfunction in a manner consistent with "good air pollution control practices"; or
3) does not provide adequate procedures for correcting malfunctioning process equipment, air pollution control techniques, or monitoring equipment as quickly as practicable.[68]

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[64] 40 CFR 63.342 (f)(3)(A) to (E).
[65] 40 CFR 63.342 (f)(3)(ii).
[66] 40 CFR 63.342 (f)(1).
[67] 40 CFR 63.342 (f)(2)(i).
[68] 40 CFR 63.342 (f)(2)(ii)(A), (B), & (C).

An Inspector must also determine if the O&M plan failed to adequately address a malfunction. If the O&M plan does not address the problem, the operator must notify the APCD and revise the O&M plan within forty five (45) days after such an event occurs.[69] The Inspector must determine whether the revised O&M plan includes:

1) procedures for operating and maintaining the process equipment, add-on air pollution control device, or monitoring equipment during similar malfunction events, and
2) a program for corrective action for such events.[70]

In addition, if the operator took actions during a malfunction which are inconsistent with the procedures in the O&M plan, the operator must record the actions taken for the event and report by phone such actions within two (2) working days after commencing actions inconsistent with the plan. The report shall be followed by a letter within seven (7) working days after the end of the event, unless the operator made alternative reporting arrangements in advance. The Inspector should request copies of such reports and records upon an inspection.[71]

The operator must keep the written O&M plan on record and make it available upon inspection for the life of the affected source or until the source is no longer subject to these regulations. If the O&M plan is revised, the operator must keep all previous versions of the O&M plan on record for inspection for a period of five (5) years after each revision to the plan.[72] Other recordkeeping and reporting requirements concerning the O&M plan are discussed in Sections 1.6.6 and 1.6.7 of this Chapter 1.0.

6.1.4 Initial Performance Testing

Initial performance testing is one of the components required (with some exceptions noted below) to demonstrate that an operator is meeting the emission limit for the particular type of operation. An initial performance test is a one time test. There are two reasons a source must perform an initial performance test. First, an initial performance test is necessary to determine if the chromium emissions from the affected source are the same or lower than the emission limits set for the source. Second, the initial performance test establishes the values or ranges of values for the air pollution control system operating parameters. Monitoring and recording these operating parameters during tank operation will give the operator an indication of whether or not the source is in compliance with the emission limits. There are detailed requirements on how an operator should determine the operating parameters.

Operators of hard chromium electroplating, chromium anodizing, and certain decorative chromium electroplating sources are required to perform an initial performance test. After performing the test, the operator must send the test results to APCD. APCD will review the test results to determine whether the source is in compliance with the regulation. Upon review, the APCD will make a final determination as to compliance and send a letter to both the operator and the local agency explaining its determination.

The sources that meet the following criteria **do not** have to perform the test and are **exempt** from

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[69] 40 CFR 63.342 (f)(3)(ii).
[70] 40 CFR 63.342 (f)(3)(ii).
[71] 40 CFR 63.342 (f)(3)(iv).
[72] 40 CFR 63.342 (f)(3)(v).

the initial performance test requirements:

1) decorative chromium electroplating tanks or chromium anodizing tanks that use a wetting agent to limit chromium emissions **and** limit the surface tension of the bath to a maximum of forty five (45) dynes/cm;[73] and
2) decorative chromium electroplating tanks that use a trivalent chromium bath that has a wetting agent as an ingredient of the bath.[74]

New sources must submit a notification of the initial performance test at least sixty (60) days prior to the test date. The test results must be reported no later than ninety (90) days following the test. See Section 1.6.7 of this Chapter 1.0 for specifics on what is required to be reported.

An Inspector's duties concerning the initial performance test are linked with the APCD's duties. The Inspector is required to determine whether the operator has met the reporting and recordkeeping requirements. An Inspector should determine whether the source has completed an initial performance test (the date of the initial performance test), sent a notification of initial performance test, developed a test plan (discussed in Section 1.6.7.3), and the initial performance test results were sent to U.S. EPA and APCD. In addition, the Inspector needs to determine whether APCD has reviewed the test results and given the source a final determination of compliance. All of these questions can be answered if the Inspector reads the test plan, notification of initial performance test, initial performance test results report, and letter from APCD to the operator and local agency. Addendum G of this Chapter 1.0 contains an example form for a notification of performance test if an operator needs a form. The following further explains what is involved in an initial performance test.

6.4.1.1 Test Methods

The Federal regulation contains the relevant test methods for measuring the chromium concentration discharged to the atmosphere: U.S. EPA Reference Methods 306 and 306A, California Air Resources Board ("CARB") Method 425, Reference Method 306B, or a validated alternative test method.[75] An Inspector is not required to review the initial performance test procedures or make any determinations concerning the test method(s) used. APCD will make any necessary determinations.

6.4.1.2 Site Specific Test Plan and Test Report

The operator shall develop and, if requested by the U.S. EPA or APCD, shall submit a site specific test plan for approval prior to testing. The test plan must describe the proposed initial performance testing program. The test plan shall include:

1) description of the process to be tested;
2) conditions under which testing is to be conducted;
3) the sampling locations; **and**
4) the test method(s) used to monitor compliance (pressure drops, velocity pressure).

An Inspector should review the test plan to determine whether these items are included.

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[73] 40 CFR 63.343 (b)(2).

[74] 40 CFR 63.343 (b)(3).

[75] 40 CFR 63.344 (c); see also Addendum C.

A performance test report must be prepared by the operator or the company contracted to do the test after testing has been conducted. The test report must contain the following information:

1) description of the process tested;
2) sampling location descriptions;
3) sampling and analysis procedures and any modifications to standard procedures;
4) test results;
5) description of the internal and external quality assurance ("QA") program and results;[76]
6) records of:
    a) operating conditions during testing,
    b) preparation of standards, and
    c) calibration procedures;
7) raw data sheets for:
    a) field sampling, and
    b) field and laboratory analyses;
8) documentation of calculations; **and**
9) any additional information required by the test method, for example if the source is trying to maintain small source status then actual cumulative rectifier capacity should be documented.

All data for the performance tests must be provided, including all flow splits if multiple sources are exhausted out of the same control device. The internal QA program shall include at a minimum the activities planned by routine operators and analysts to provide an assessment of test data precision. An example of internal QA is the sampling and analysis of replicate samples.[77]

The test report must be submitted to U.S. EPA as part of the reporting requirements discussed in Section 1.6.7 of this Chapter 1.0. An Inspector should review the site specific test plan and the performance test report and determine whether the operator included the items listed above.

6.4.1.3 Monitoring Requirements and Operating Parameters

During the initial performance testing, the applicable air pollution control system operating parameters must be recorded. These operating parameters are determined by the air pollution control system being used and are listed in Tables 1.8 and 1.9. At the conclusion of testing, a range of acceptable values or a maximum or minimum value for these parameters can be established as described in column three of Table 1.9. The Inspector must review these parameters to ensure that the ongoing compliance measurements (see Section 1.6.5 of this Chapter 1.0) fall within the range of values.

6.4.1.4 Time Requirement for Initial Performance Test

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[76] 40 CFR 63.7 (c)(2)(i).

[77] 40 CFR 63.7 (c)(2)(ii).

The operator shall notify the U.S. EPA or APCD in writing of the operator's intention to conduct a performance test at least sixty (60) days before the performance test is scheduled. This notice allows the U.S. EPA or APCD, upon request, to review and approve the site specific test plan and to have an observer present during the test.[78] The operator shall perform the initial test according to one of the following scenarios:

1) hard chromium electroplating existing source with startup date before 1/25/95 must test before July 24, 1997;
2) hard chromium electroplating existing source with startup date after 1/25/95 must test within 180 days of initial startup;
3) decorative chromium or chromium anodizing existing source with startup date before 1/25/96 must test before July 24, 1996;
4) decorative chromium or chromium anodizing existing source with startup date after 1/25/96 must test within 180 days of initial startup;
5) any new or reconstructed source with a startup date before January 25, 1995 the operator must test before July 24, 1995;
6) any new or reconstructed source with a startup date after January 25, 1995 and construction or reconstruction commenced before January 25, 1995 must test within 180 days of initial startup; **or**
7) any existing, new, or reconstructed source within 180 days after the termination date of the source's extension of compliance if the source obtained an extension.[79]

The Inspector should determine whether the operator sent a notification of initial performance test and met the time requirement for the initial test. See Table 1.7 for the required initial performance test dates.

6.4.1.5 Applicability of Previous Test Results

If an operator has already conducted a test to obtain an operating permit in Colorado, the results of the testing can be used to demonstrate compliance with this regulation only if each of the following criteria is demonstrated:

1) the appropriate test methods were used;
2) the test was conducted under representative operating conditions;
3) the test report contains the elements listed in Section 1.6.4.2;
4) the test was conducted after December 1991; and
5) the operator developed sufficient monitoring data to establish the operating parameter values that correspond to compliance with emission limits.

If an operator cannot establish that each of these criteria are met, the operator must retest. The Inspector does not need to determine whether the operator met the criteria. APCD will determine this. However, the Inspector should indicate whether the operator is attempting to meet these criteria or if APCD determined that the operator met the criteria and does not need to perform an initial

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[78] 40 CFR 63.7 (b).

[79] 40 CFR 63.7 (a)(2).

performance test.

6.1.5 Ongoing Compliance Monitoring

Continuous compliance with the applicable emission limits is demonstrated through ongoing compliance monitoring. By monitoring and recording the appropriate air pollution control system parameters and comparing the monitored values to the range of values, maximum value, or minimum value established during the initial performance test, an operator and Inspector can determine whether the source is in continuous compliance with the emission limits.

Therefore, the monitoring requirements vary depending on the type of control technique that is being used and the type of facility (i.e., hard chromium electroplating, decorative chromium electroplating, or chromium anodizing). See Tables 1.8 and 1.9 for monitoring requirements. Decorative chromium electroplating tanks that use a trivalent chromium bath which incorporates a wetting agent as a bath ingredient are **exempt** from these requirements and do not need to do any ongoing compliance monitoring. An Inspector must know what parameters must be measured, be able to determine whether the operator is properly obtaining the measurements, and determine by the monitoring results whether the source is in compliance. A tank is out of compliance with the emission limits, or has excess emissions, if the monitored values:

1) fall outside the range of values established for pressure drop and velocity pressure; **or**
2) exceed the maximum surface tension; **or**
3) fall below the minimum foam blanket thickness.

6.5.1.1 Test Methods for Add-on Air Pollution Control Devices

If an operator uses an add-on air pollution control device that is specified in the regulation (packed bed scrubber, composite mesh pad, or fiber bed mist eliminator), the operator must monitor several parameters on a daily basis: the pressure drop and/or the velocity pressure. The base parameters that the daily test results will be compared against are established in the initial performance test.

If a packed bed scrubber is used, both the daily pressure drop and the velocity pressure (i.e., the velocity of the gas stream at the inlet of the unit) must be measured.[80] First, on and every day the tank is operating after the initial performance test, the operator must monitor and record the velocity pressure at the inlet to the packed bed scrubber. To be in compliance the scrubber system must be operated within plus/minus ten percent of the velocity pressure value that the operator established during the initial performance test. In the alternative, the operator can determine if the daily measurements fall within a range of velocity pressure values established by the operator during multiple performance tests.[81] Addendum A details how a velocity pressure measurement is done.

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[80] 40 CFR 63.343 (c)(2)(ii).

[81] 40 CFR 63.343 (c)(2)(ii).

Second, on and every day the tank is operating after the initial performance test, the operator must monitor and record the pressure drop across the scrubber system every day. To be in compliance the scrubber system must be operated within plus/minus one inch of water column of the pressure drop value that the operator established during the initial performance test. In the alternative, the operator can determine if the daily measurements fall within a range of pressure drop values established by the operator during multiple performance tests.[82] Addendum A details how pressure drop measurements are done.

If a composite mesh pad is used, the operator must monitor and record the pressure drop across the composite mesh pad once each day that the source is operating.[83] To be in compliance, the composite mesh pad system must be operated within plus/minus one inch of water column of the pressure drop value that the operator established during the initial performance test. In the alternative, the operator can determine if the daily measurements fall within a range of pressure drop values established by the operator during multiple performance tests.[84] Addendum A details how pressure drop measurements are done.

If an operator uses both a packed bed scrubber and a composite mesh pad system, the operator must comply with the monitoring requirements for a composite mesh pad system and thus, measure the pressure drop across the composite mesh pad system once each day.

An operator using a fiber bed mist eliminator must, on and every day the tank is operating after the initial performance test, monitor and record the pressure drop across the fiber bed mist eliminator **and** the control device installed upstream of the fiber bed to prevent plugging every day.[85] To be in compliance the fiber bed mist eliminator **and** the control device must be operated within plus/minus one inch of water column of the pressure drop value that the operator established during the initial performance test. In the alternative, the operator can determine if the daily measurements fall within a range of pressure drop values established by the operator during multiple performance tests.[86] Addendum A details how pressure drop measurements are done.

6.5.1.2 Test Methods for Chemical Fume Suppressants

There are different requirements if an operator uses a chemical fume suppressant (wetting agent or foam blanket). If wetting agents are used then the surface tension of the bath must be monitored. Surface tension is the property that exists in the surface film of all liquids and tends to prevent liquid from spreading. The operator must monitor the surface tension of the electroplating or anodizing bath on and after the date on which the initial performance test is required to be completed.[87] The regulation contains a test method for measuring the surface tension of the bath: U.S. EPA Reference Method 306B “Surface Tension Measurements and Recordkeeping for Tanks Used at Decorative Chromium Electroplating and Anodizing Facilities” (see Addendum B). This method must be used to determine the surface tension of electroplating and anodizing baths if the operator chooses to comply with the surface tension limit rather than the emission limit or if the operator uses a wetting agent.

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[82] 40 CFR 63.343 (c)(2)(ii).
[83] 40 CFR 63.343 (c)(1)(ii).
[84] 40 CFR 63.343 (c)(1)(ii).
[85] 40 CFR 63.343 (c)(4)(ii).
[86] 40 CFR 63.343 (c)(2)(ii).
[87] 40 CFR 63.343 (c)(5)(ii).

There are two different devices used to test the surface tension: stalagmometer and tensiometer (ring method). An operator must measure the surface tension once every four (4) hours during operation of the tank with a stalagmometer or a tensiometer.[88] An operator may be interested in knowing that the monitoring frequency of surface tension and foam blanket thickness can be decreased. Table 1.8 includes a description in the footnotes concerning when the monitoring frequency can be decreased. If an exceedance occurs, the original monitoring schedule of four (4) hours must be resumed.[89] In addition, once the bath solution is drained from the tank and a new solution added, the original monitoring schedule of once every four (4) hours must be resumed.[90]

A source is considered out of compliance if the surface tension is greater than the value established during the performance test or greater than forty five (45) dynes per centimeter.[91]

There are several practical tips Inspectors should be aware of concerning surface tension testing. First, when an operator measures the surface tension using a tensiometer or ring method there cannot be any external vibrations. For example, while the operator is testing there should be no heavy machinery being operated nearby. Second, the temperature and surface tension are on a relational curve. Thus, when measuring the surface tension the operator needs to keep the sample temperature the same as the bath temperature. Addendum C provides more details concerning the three devices used to measure surface tension.

If a foam blanket is used then the foam thickness must be monitored. The operator must monitor the foam blanket thickness of the electroplating or anodizing bath on and after the date on which the initial performance test is required to be completed.[92] The thickness must be measured once every one hour that the tank is operating.[93] An operator may be interested in knowing that the monitoring frequency of foam blanket thickness can be decreased. Table 1.8 includes a description in the footnotes concerning when the monitoring frequency can be decreased. If an exceedance occurs, the original monitoring schedule of once every hour must be resumed.[94] In addition, once the bath solution is drained from the tank and a new solution added, the original monitoring schedule of once every hour must be resumed.[95]

A foam blanket is usually maintained at a thickness of 1.3 to 2.5 cm (0.5 to 1.0 in.) and covers the entire surface of the bath. An Inspector should make sure that the foam blanket is not too thick (>5 cm), because it collects the hydrogen gas and with the electrical currents being used it can cause an explosion. Also, the foam blanket should not be too thin (<1.3 cm), because it will no longer trap the chrome. If a source uses a control system not specified in the regulation, the operator must determine the appropriate parameter(s) to monitor and get U.S. EPA approval.[96]

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[88] 40 CFR 63.343 (c)(5)(ii)(A).
[89] 40 CFR 63.343 (c)(5)(ii)(C).
[90] 40 CFR 63.343 (c)(5)(iii).
[91] 40 CFR 63.343 (c)(5)(ii).
[92] 40 CFR 63.343 (c)(6)(ii).
[93] 40 CFR 63.343 (c)(6)(ii)(A).
[94] 40 CFR 63.343 (c)(6)(ii)(C).
[95] 40 CFR 63.343 (c)(6)(iii).
[96] 40 CFR 63.344 (c)(8).

Finally, an operator can be using a combination of a chemical fume suppressant and an add-on control device, and both are needed to comply with the applicable emission limit. In that situation, the operator must comply with the monitoring requirements for each chemical fume suppressant and add-on control device used.[97] For example, if a packed bed scrubber and wetting agent are used, the monitoring requirements for both must be followed. An operator can also use both a chemical fume suppressant and an add-on control device, but only one of the techniques is needed to comply with the emission limits. In this situation, the operator need only follow the monitoring requirements for the control technique used to achieve compliance.[98]

6.5.1.3 Monitoring Requirements for Multiple Tanks Attached to One Control System

Finally, there are special compliance provisions for determining compliance with emission limits if there are multiple tanks attached to one control system **and**:

1) the multiple tanks include a chromium electroplating or chromium anodizing tank among other tanks not affected by the regulation; **or**
2) the multiple tanks include chromium tanks performing different operations subject to different emission limits (e.g., hard chromium electroplating and anodizing), which may or may not be controlled with nonaffected sources; **or**
3) the multiple tanks include hard chromium tanks subject to different emission limits (e.g., a new tank and an existing small tank), which may or may not be controlled with nonaffected sources.

In these situations, it is very difficult to directly determine compliance with the emission limits in the regulation. Therefore, the notes in Table 1.4 of this document provide equations for verifying compliance with the emission limits in these situations.[99] An Inspector should take the time to verify compliance by using the equation.

6.1.6 Recordkeeping

The Federal regulation requires operators to keep records to document compliance with the regulation. The records discussed in this section constitute a significant portion of the O&M plan discussed in Section 1.6.3. The required documentation includes:

1) inspection and equipment maintenance records;
2) malfunction records;
3) records of the occurrence, duration, and cause of excess emissions;
4) records of actions taken during malfunction;
5) performance test results;
6) monitoring data records;
7) excess emission records;
8) process records; and

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[97] 40 CFR 63.343 (c)(7)(i).

[98] 40 CFR 63.343 (c)(7)(ii).

[99] 40 CFR 63.344 (e).

9) miscellaneous records.

All records must be kept for at least five (5) years. If it is a decorative chromium electroplating tank that uses trivalent chromium bath, the operator only needs to keep records of bath component purchases. An Inspector should determine whether the operator is completing, updating, and keeping for at least five (5) years all of the required records.

6.6.1.1 Inspection and Maintenance Records

Section 1.6.3 discusses the various work practice standards that apply to air pollution control systems and monitoring equipment and how often these practices must be conducted. Records must be maintained to show that the work practices were conducted on schedule.[100] The records can take the form of a checklist. Example checklists for a composite mesh pad system, packed bed scrubber, and fiber-bed mist eliminator are provided in Addendum D of this Chapter 1.0. For example, the checklist for a packed bed scrubber includes recordkeeping on: work practice standards, performance test monitoring, pressure drop monitoring, inlet velocity pressure gradients, and any maintenance performed on the equipment. The checklist must identify the device inspected, the date of inspection, a brief description of the working condition of the device during the inspection, and any actions taken to correct deficiencies found during the inspection. An Inspector should review the inspection checklist and determine whether all of these items are included.

An operator must also keep records of all maintenance performed on the process, air pollution control system, and monitoring equipment.[101] Such records could be the contractor invoices describing the work or handwritten descriptions of the maintenance performed. Important items such as maintenance performed, time out of service, when the work was performed, are all very important in determining if a facility is in compliance with the regulations. Good records will eventually lead to an excellent preventative maintenance program and can be included into the O&M plan.

6.6.1.2 Malfunction Records

The operator must maintain records of the occurrence, duration, and cause of any malfunction of the process, air pollution control device, and monitoring equipment under certain circumstances.[102] If the actions required to correct the malfunctions were consistent with those described in the O&M plan, then records of these actions need not be kept. If the actions required to correct the malfunction were not consistent with those in the O&M plan, then records of the actions must be maintained and the O&M plan must be revised accordingly. Such records must be kept so that U.S. EPA and APCD can determine whether the O&M plan was properly revised to include the actions that were actually taken.

The following is an example of a control device malfunction:

> After the initial installation of a packed bed scrubber, the packing material settles which sometimes opens up a gap in the top of the horizontal flow units. Settling of this packing material should be indicated by a loss in pressure drop across the unit because the air flow is following the path of least resistance and bypassing the packed bed. To correct this problem,

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[100] 40 CFR 63.346 (b)(1).

[101] 40 CFR 63.346 (b)(2).

[102] 40 CFR 63.346 (b)(3).

additional packing material should be added to the top of the packed bed.

6.6.1.3 Performance Test Results

Test reports documenting the results of performance tests conducted on the affected source must be maintained for five (5) years.[103] The test report must contain process and air pollution control system operating parameter measurements obtained during testing. Any additional measurements required for those facilities using a common control system to reduce emissions from multiple sources at a facility should also be included in the test report.[104]

6.6.1.4 Monitoring Data Records

Records of the monitoring data used to determine compliance with the emission limits must also be maintained.[105] Table 1.8 lists the monitoring requirements for each of the air pollution control systems. Monitoring data can be recorded on a simple form that identifies the control system, the monitored parameter(s), and the value of the monitored parameter(s), and the time and date when the parameter was monitored. An example of a monitoring data form developed for a packed bed scrubber is provided in Addendum E of this Chapter 1.0.

By maintaining daily monitoring records, the operator may be able to reduce the frequency of monitoring if the operator uses decorative chromium plating processes and control parameters such as foam blanket depth and surface tension. Surface tension and foam depth must initially be monitored every four hours and every hour respectively. If the source is in compliance for forty (40) hours without any excursions from the parameter ranges, the measurements can be reduced to eight (8) hours and four (4) hours respectively. After another forty (40) hours of compliance, measurements can be reduced to forty (40) hours and eight (8) hours respectively. If a trivalent chromium process is being used, then the operator only needs to keep the MSDS with wetting agent highlighted. If the trivalent bath is converted to a hexavalent process having a different emission limitation, then the facility has one year from the date of conversion to attain compliance with the decorative limitations.

6.6.1.5 Excess Emissions Records

Excess emissions occur when the values of the monitored parameters exceed the value or range of values established under the performance test. Whenever excess emissions are reported, it must be thoroughly documented.[106] Excess emissions may be the result of monitoring parameters being out of spec, or due to some malfunction of the pollution control equipment or process tanks. If it is the result of a malfunction the operator must record the type of malfunction, duration of malfunction, suspected cause, corrective actions, and date and time of malfunction, regardless of the cause of the excess emissions. If excess emission are caused by something other than malfunction the operator must record the: date and time the excess began, date and time the excess ended, and corrective action(s) taken. The excess emission reports must be contained in the operator's ongoing compliance status report, described in Section 1.6.5 of this Chapter 1.0.

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[103] 40 CFR 63.346 (b)(6).

[104] 40 CFR 63.346 (b)(7).

[105] 40 CFR 63.346 (b)(8).

[106] 40 CFR 63.346 (b)(9) and (10).

Reports of excess emissions will result in more frequent submittal requirements by the permit authority. APCD will require major sources with reported exceedances to submit quarterly ongoing compliance reports instead of on a semiannual basis. Area sources with reported exceedances must submit semiannual ongoing compliance reports instead of on an annual basis. In addition, the operator must complete log sheets that support the explanation for the exceedance. If equipment malfunctioned, then the maintenance checklist should reflect the work performed and over what time frame.

All of this information must be on file for a minimum of five (5) years. The example monitoring data form in Addendum E of this Chapter 1.0 provides a space to record the start and end times of excess emission episodes.

6.6.1.6 Process Records

The process operating time for each chromium electroplating or chromium anodizing tank must be recorded.[107] For tanks using chemical fume suppressants, the date and time of each addition of chemical fume suppressants must be recorded.

If the source is a hard chromium tank, and the operator is using the actual rectifier capacity to demonstrate that it is a small, hard chromium tank (for purposes of emission limits), then the actual rectifier capacity expended by month and the total capacity expended for the reporting period (semiannual for major sources and annual for area sources) must be recorded.[108] If a facility changes its status from small hard chromium electroplating to a large hard chromium electroplating source, then the source has one year from the month that it demonstrates large source status to comply with the large source criteria.

For decorative chromium tanks using a trivalent chromium bath, records of the bath components purchased must be maintained with the wetting agent clearly identified as a bath constituent contained in one of the bath components.[109] These records may be invoices showing the bath components (including the wetting agent), quantities purchased, and date of purchase.

If an operator uses a chemical fume suppressant as a control technique, records of the date and time the chemical fume suppressants are added to the electroplating or anodizing bath must be kept.[110]

6.6.1.7 Miscellaneous Records

The operator must also keep records necessary to demonstrate consistency with the provisions of the O&M plan discussed in Section 1.6.3 of this Chapter 1.0.[111] In addition, if an operator was granted a waiver of recordkeeping or reporting requirements, the operator must keep records of information demonstrating whether the source is meeting the requirements for that waiver.[112] Finally, an operator must keep all the documentation supporting the notifications and reports required and listed in Section 1.6.7 of this Chapter 1.0.

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[107] 40 CFR 63.346 (b)(11).

[108] 40 CFR 63.346 (b)(12).

[109] 40 CFR 63.346 (b)(14).

[110] 40 CFR 63.346 (b)(13).

[111] 40 CFR 63.346 (b)(5).

[112] 40 CFR 63.346 (b)(15).

6.1.7 Reporting

This section focuses on the deadlines that must be met for reporting and the information that must be maintained in records for the recordkeeping to be complete. The Inspector should determine whether the operator has met all of the required deadlines for reporting. The addendums attached to this Chapter 1.0 include example tables to use in keeping track of the necessary information. The examples can be given to operators, for example, if the Inspector discovers that the operator is not keeping proper records.

The extent and frequency of reporting depends upon the type and size of the source and all reports must be submitted to U.S. EPA and the APCD.[113] The report may be sent by U.S. mail, fax, electronically, courier, and in certain situations, electronically.[114] In summary, the Federal regulation requires the following reports and notifications be made by the operator:

1) notification of construction or reconstruction of the facility;
2) an initial notification that the source is subject to the regulation;
3) a notification of initial performance testing;
4) a report of the performance test results and compliance status after the test; and
5) a report on the ongoing compliance status of the facility.

An operator of a decorative chromium electroplating tank that uses a trivalent chromium bath, only needs to submit the initial notification and an initial compliance status report. The Inspector should request the operator retrieve such reports and verify that the operator is meeting the reporting requirements.

6.7.1.1 Notification of Construction or Reconstruction

The first type of notification is in the event an operator has recently constructed or reconstructed, or will be in the near future constructing or reconstructing a source of chromium emissions at the facility.[115] This notification informs the regulatory agency that the facility is starting up a new source or modifying an existing source and is in addition to the New Source Review ("NSR"), Air Pollution Emission Notice ("APEN"), and permit requirements for new and modified sources. See Table 1.10 for details on when this notification is required.

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[113] After the State receives delegation of the 112 programs, the source need only submit reports to the State and no longer to U.S. EPA.

[114] 40 CFR 63.347 (a)(1).

[115] 40 CFR 63.346 (b).

If the operator began construction prior to January 25, 1995 and the tank was not operational prior to January 25, 1995, the notification was due no later than March 26, 1995.[116] After January 25, 1995, no operator may begin construction or reconstruction of new or reconstructed sources without submitting a notification of construction or reconstruction to APCD. Notification must be submitted as soon as practicable before construction or reconstruction is planned to begin.[117] Colorado's NSR program (Regulation No. 3 Part B) requires that new or reconstructed sources subject to a MACT standard must obtain a construction permit prior to commencing construction.[118] The Inspector should ask the operator whether he/she has or is planning to construct or reconstruct a source of chrome emissions at the facility. If the answer is yes, the Inspector should request that the operator show the Inspector copies of any such notifications and inform the operator of the need to obtain a permit. An example form for a notification of construction or reconstruction is found in Addendum F of this Chapter 1.0 and it also provides what is required to be reported in a notification of construction or reconstruction.[119]

6.7.1.2 Initial Notification

Following notification of construction, an "initial notification" must be submitted to the regulatory agency. For existing sources (initial startup date before January 25, 1995), the operator must have submitted an initial notification to the appropriate agency on or before July 24, 1995 (180 days after promulgation of the final rule). If a source is "new" or "reconstructed" and started after January 25, 1995, the operator must submit an initial notification to the appropriate agency within thirty (30) calendar days after the startup date.

If the source was a new or reconstructed source and operation began before January 25, 1995, this notification can be made simultaneously with the construction notification in Section 1.6.7.1. Finally, if the new construction or reconstruction was commenced after January 25, 1995, notification is required within thirty (30) calendar days after the startup date. Table 1.10 details the above stated requirements.

The initial notification content is similar to the construction notification, but with more detail. This notification spells out the regulations that will apply to the operation at the facility and specifies the ways the limitations will be met (i.e., pollution control equipment, wetting agents, trivalent baths, etc.). Specifically, the following must be included in this initial notification:

1) name, title, and address of the owner or operator;
2) address of each affected source;
3) statement that Subpart N, 40 CFR Part 63, is the basis for this initial notification;
4) identification of the applicable emission limitation and compliance date for each tank;
5) brief description of each tank, including the type of process operation performed;
6) hard chromium electroplating facilities must indicate the maximum cumulative rectifier capacity;
7) hard chromium electroplating facilities must state whether the source is a large or small facility and whether this is demonstrated through actual or maximum potential cumulative

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[116] 40 CFR 63.346 (b)(5)(ii).

[117] 40 CFR 63.346 (b)(5)(i).

[118] Regulation No. 3, Part B § III.A.5.

[119] 40 CFR 63.345 (b)(2) and (3).

rectifier capacity;

8) hard chromium electroplating facilities must state whether the operator will limit the maximum potential cumulative rectifier capacity such that the facility is considered small; and
9) statement as to whether the tank is located at a major or area source.[120]

An example of an initial notification form is provided in Addendum G of this document.

6.7.1.3 Notification of Initial Performance Test, Initial Performance Test Results, and Notification of Compliance Status

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[120] 40 CFR 63.347 (c)(1).

An operator must notify the APCD in writing of an intent to conduct an initial performance test at least sixty (60) calendar days before the scheduled date of the test.[121] This allows the APCD, if it chooses, to have an observer present at the test. If the scheduled date for the test is changed, the operator must inform the APCD within five (5) calendar days of the originally scheduled test date and must specify the date of the rescheduled test. Addendum H of this Chapter 1.0 contains an example form for a notification of performance test.

The initial performance test results must be reported no later than ninety (90) days after the initial performance test (if testing is required).[122] These test results will be submitted with the final notification or "notification of compliance status." The notification of compliance must include:

1) applicable emission limitation and methods used to determine compliance;
2) if performance test is required, the test report documenting the results;
3) type and quantity of hazardous air pollutants emitted;
4) specific operating parameter value, or range of values, for each monitored parameter;
5) methods that will be used to determine continuous compliance;
6) description of the air pollution control technique for each emission point;
7) statement that the operator has the O&M plan completed and on file;
8) if it is a hard chromium electroplating facility claiming small status based upon actual cumulative rectifier capacity, records supporting claim; and
9) statement by the operator as to whether the tank is in compliance with this regulation.[123]

An example of a notification of compliance status form is in Addendum I. The Operating and Maintenance Plan must be submitted with the compliance status notification (see Section 1.6.3 for details on Operating and Maintenance Plan).

If initial performance testing is required, a copy of the test report must be submitted as support for the test results (see Section 1.6.4.2 for list of items to be included in the test report). If the Title V permit for the source has not been issued, the operator should send the notification of compliance status and the results of any performance tests conducted to the U.S. EPA.[124] If a Title V permit has been issued, the operator should send the notification of compliance status to the appropriate permitting agency.[125]

Testing may not be required due to the nature of the operations (i.e., anodizing, decorative chrome, trivalent chrome) then the compliance status notification must be submitted within thirty (30) days of January 25, 1996. If only trivalent chromium plating is performed at the facility, then a statement indicating that this is the case and a copy of the MSDS with the wetting agent clearly highlighted will suffice. This must be sent within thirty (30) days of January 25, 1996.

6.7.1.4 Ongoing Compliance Status Reports

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[121] 40 CFR 63.347 (d)(1).

[122] 40 CFR 63.347 (f)(2).

[123] 40 CFR 63.347 (e)(2).

[124] 40 CFR 63.347 (e)(2) and (f)(1).

[125] 40 CFR 63.347 (e)(2) and (f)(1).

Once an operator has made the appropriate notifications and completed its recordkeeping requirements, semiannual or annual reports must be maintained and submitted.[126] These reports are called "ongoing compliance reports." The ongoing compliance status report requirements vary depending upon whether the source is located at a "major source" site or is an "area source."

If a source is a **major source**, the operator must submit ongoing compliance status reports to the APCD every six (6) months. The APCD may decide on a case by case basis to require a source to submit ongoing compliance status reports more frequently. In addition, if a source experiences exceedances of the emission limits as established by ongoing monitoring of air pollution control system operating parameters, then the source will be required to submit quarterly reports.

A major source that is required to submit ongoing status reports on a quarterly or more frequent basis may reduce the frequency of reporting to semiannual. To reduce the reporting frequency, the following conditions must be met:

1) the ongoing compliance status reports show that the source is in compliance for a full year (e.g., four (4) consecutive quarterly or twelve (12) consecutive monthly reporting periods);
2) the source complies with all applicable recordkeeping and monitoring requirements; and
3) the APCD does not object to the reduced reporting frequency.

The operator must notify the APCD of its intention to reduce the reporting frequency. The notification should be in the form of a letter to the APCD which includes:

1) a description of the initial exceedance that caused the source to have to report more frequently;
2) any actions taken to address the exceedance;
3) the subsequent period of compliance (at least one (1) year); and
4) the intention of the operator to reduce the frequency of submittals of ongoing compliance status reports.

The APCD may review all previously submitted reports or records kept by the source to make a judgment on whether the reduced frequency request should be approved. Approval is automatically granted if the U.S. EPA or APCD does not issue a notice of disapproval within forty five (45) days after a request is submitted. Addendum J has an example ongoing compliance status report which an Inspector can provide to operators if requested or needed.

An operator of an **area source** must maintain and submit annual ongoing compliance status reports.[127] If a source is an area source, the operator must prepare ongoing compliance status reports that contain the same information as for major sources. The reports must be prepared annually, retained onsite, and made available to the appropriate agency upon request. However, semiannual reports are required to be prepared and submitted to the appropriate agency, if the following conditions are met:

1) the total duration of excess emissions (as indicated by monitoring data) is one percent (1%) or greater of the total operating time for the reporting period; **and**
2) the total duration of malfunctions of the add-on air pollution control equipment and

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[126] 40 CFR 63.347 (g).

[127] 40 CFR 63.347 (h).

monitoring equipment is five percent (5%) or greater of the total operating time.

In addition, the APCD may choose to require that ongoing compliance status reports be completed more frequently and submitted regardless of whether these conditions are met. Similar to major sources, an area source operator may petition the APCD to reduce the frequency of reporting and/or retain the required reports onsite.

6.7.1.5 Trivalent Chromium Bath Reports

If an operator uses a trivalent chromium bath, the operator must submit the following reports instead of the reports described above:

1) by July 24, 1995, an initial notification; and
2) by February 24, 1996, a notification of compliance status that updates the information in the initial notification or a statement that the initial notification is still accurate.[128]

If an operator decides to change the process from using a trivalent chromium bath to another process (e.g., to a hexavalent chromium process), the operator must submit a report within thirty (30) days after the change. The report must include:

1) a description of the change and any change in the emission limit; and
2) if a different emission limits applies, the information required in the initial notification described above in Section 1.6.7.2 of this Chapter 1.0.

In addition, the operator must submit all other applicable notifications described above according to the appropriate schedules.

1.7 Pollution Prevention Measures

Congress enacted the Pollution Prevention Act ("PPA") in 1990 and declared it to be the nation's policy that, where feasible, pollution should be prevented or reduced at the source. The PPA states that source reduction is more desirable than waste management and pollution control. Source reduction is defined as any practice that reduces the amount of any hazardous substance entering the waste stream or otherwise released into the environment prior to recycling, treatment, or disposal. Therefore, an operator must consider wastewater, hazardous waste, and solid waste effects and regulations as well as air in selecting any method of air pollution control.

The chromium electroplating regulation allows for pollution prevent measures to be used when complying with the requirements of the regulation. There are two source reduction alternatives available. The first is the use of chemical fume suppressants as discussed in Section 1.5.2 of this Chapter 1.0. The chemical fume suppressants inhibit chromium emissions at the electroplating or anodizing tank. The second technique involves the use of a trivalent chromium electroplating process instead of the traditional hexavalent chromium (chromic acid) process.

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[128] 40 CFR 63.347 (i).

1.8 Glossary of Terms

Actual emissions: The actual rate of emissions from a source not including excess emissions from a malfunction or startups and shutdowns associated with a malfunction. Actual emissions are calculated using the source's actual operating rates, and types of materials processed, stored, or combusted during the selected time period.

Add-on pollution control device: Equipment which is installed in the ventilation system of electroplating sources to collect and hold chromium emissions from the tanks. This includes: composite mesh pad systems, packed bed scrubber systems, and fiber-bed mist eliminator systems.

Affected source: The chromium electroplating or chromium anodizing tanks at facilities performing hard chromium electroplating, decorative chromium electroplating, or chromium anodizing.

Air pollution or control technique: Any method that is used to reduce chromium emissions from chromium electroplating and chromium anodizing tanks. The two types of air pollution control techniques utilized to reduce chromium emissions from electroplating and anodizing systems are add-on air pollution control devices and chemical fume suppressants.

Alternative test method: Any method of sampling and analyzing for an air pollutant that is not at est method listed by U.S. EPA in this regulation and has been demonstrated using Method 301 to U.S. EPA that it produced adequate results. U.S. EPA must sign off on the alternative method before it can be used.

Ampere: That constant current which, if maintained in two straight parallel conductors of infinite length and placed one meter apart in vacuum, would produce between the conductors a force equal to $2x10^{-7}$ newton per meter of length.

Anodizing bath: The electrolytic solution used as the conducting medium. It is the conducting medium in which the flow of current is accompanied by movement of metal ions for the purposes of electroplating metal out of the solution onto a work piece or for oxidizing the base material.

Area source: Also called a "minor source." Any stationary source of air pollutants that is not a major source. Therefore, if a source has a potential to emit less than ten (10) tons per day of any one type of hazardous air pollutant, then that source is considered an area source. If a source has the potential to emit less than twenty five (25) tons per day of any combination of hazardous air pollutants, then that source is also considered an area source.

Base material: The metal alloy that comprises the work piece.

Capillary tube: A device used to measure surface tension.
Chemical fume suppressant: Any chemical agent used to reduce or suppress fumes or mists at the surface of an electroplating or anodizing bath. Another term for chemical fume suppressant is mist suppressant. This includes wetting agents, foam blankets, and combinations that include both a wetting agent and a foam blanket.

Chromic acid: The common name for chromium anhydride (CrO_3).

Chromium: A steel grey lustrous, hard metal that takes a high polish. The principal ore is chromite. Chromium is used to harden steel, to manufacture stainless steel, and to form many useful alloys. It is used in plating to produce a hard, beautiful surface and to prevent corrosion. Compounds of chromium are used by the aircraft and other industries for anodizing aluminum. Chromium compounds are toxic and should be handled with the proper safeguards.

Chromium anodizing or chromic acid anodizing: The electrolytic process by which a chromium oxide film or layer is produced on the surface of a base metal (i.e., aluminum) electrolytically. The process uses a chromic acid solution. In chromium anodizing, the part to be anodized acts as the anode in the electrical circuit, and the chromic acid solution serves as the electrolyte. The chromic acid solution typically has a concentration ranging from fifty (50) to one hundred (100) grams per liter. The result is a layer which provides corrosion resistance for aircraft parts or architectural structures or electrical insulation. Examples of chromium anodizing products include aircraft parts, electronic parts, architectural structures, and bicycle rims.

Chromium electroplating: A process by which a layer of chromium is electrodeposited on a base material. A layer of chromium is deposited on a material (i.e., a base metal) through a chemical change created by an electric current passing through a nonmetallic material (i.e., the solution). The result is a hard layer of chromium coating the base material. The process is used for several purposes, including to: 1) protect the base material from corrosion; 2) provide a layer of electrical insulation; 3) create a surface which provides wear resistance, a low coefficient of friction, and hardness; and 4) add a decorative layer onto the base material.

Chromium electroplating or chromium anodizing tank: The receptacle or container in which hard ro decorative chromium plating or anodizing occurs.

Commenced: It is when the operator has begun a continuous program of construction or reconstruction or the operator has entered into a contractual obligation to begin and complete a continuous program of construction or reconstruction of a chromium electroplating or chromium anodizing tank.

Compliance date: The date by which a chromium electroplating or chromium anodizing source must be in compliance with a relevant standard, limitation, prohibition, or any other federally enforceable requirement.

Composite mesh pad system: An add-on pollution control device which typically consists of several layers of interlocked fibers densely packed between two supporting grids. The composite mesh pad was developed to remove small particles (< 5 µm or 0.2 mils) that were not effectively controlled by other control devices. There are usually at least three mesh pad stages. The first stage removes large particles. The second stage removes smaller particles using a composite mesh pad. The final stage may remove any reentrained particles not collected by the composite mesh pad in the second stage. A reentrained particle is a particle which was caught by the mesh pad, but some force removed it from the mesh pad and returned it to the air stream.

Construction: The on-site fabrication, erection, or installation of a chromium electroplating or chromium anodizing tank.

Decorative chromium electroplating: The process by which a thin layer of chromium (typically 0.003 to 2.5 microns) is electrodeposited on a base metal, plastic, or undercoating to provide a bright surface with wear and tarnish resistance. It is one action in a series of plating steps which results in a thin layer of chromium being deposited on a base material. In decorative chromium electroplating, the base material serves as the cathode in the electrolytic cell and the solution serves as the electrolyte. Examples of decorative chromium products include auto bumpers and trim, bathroom fixtures, and tools.

Dry standard cubic meter (dscm): A meter cubed of emissions from a source with the water removed from the emissions. The concentration of particular air pollutants if the water is removed. Used in air quality measurements.

Dyne: A unit of force that when applied to a mass of one gram, produces an acceleration of one centimeter per second per second.

Effective date: The date that this regulation was promulgated: January 25, 1995.

Electrolysis: The production of chemical changes by passage of an electric current through an electrolyte.

Electrolyte: A nonmetallic electric conductor in which current is carried by the movement of ions.

Electroplate: Means to coat metal by using electrolysis.

Electroplating or anodizing bath: The electrolytic solution used as the conducting medium. It is the conducting medium in which the flow of current is accompanied by movement of metal ions for the purposes of electroplating metal out of the solution onto a work piece or for oxidizing the base material.

Emission limitation: The concentration of chromium allowed by U.S. EPA to be emitted expressed in milligrams per dry cubic meter (mg/dscm), or the surface tension expressed in dynes per centimeter (dynes/cm).

Existing source: Any affected source which is not a new source. Therefore, an existing source is any chromium electroplating or chromium anodizing tank which was constructed and began operating prior to December 16, 1993.

Facility: The major or area source at which chromium electroplating or chromium anodizing is performed. In other words, the building or collection of buildings where chromium electroplating or chromium anodizing occurs.

Federally enforceable: All limitations and conditions that are enforceable by U.S. EPA and U.S. citizens under the Federal Clean Air Act, or that are enforceable under other U.S. EPA statutes. For example: emission standards, new source performance standards, all terms and conditions in a Title V

Operating Permit, limitations and conditions that are part of an approved State Implementation Plan, limitations and conditions that are part of the State's approved MACT program, and individual consent agreements that U.S. EPA has the legal authority to create.

Fiber Bed Mist Eliminator: An add-on air pollution control device that removes contaminants from a gas stream through the mechanisms of inertial impaction and Brownian diffusion. It consists of one or more fiber beds and each bed consists of a hollow cylinder formed from two concentric screens. The fiber between the screens may be made of glass, ceramic plastic, or metal. Fiber bed units are designed for horizontal, concurrent gas liquid flow through the fiber bed. The contaminated gas stream flows toward the downstream face of the bed. The acid mist in the gas stream impacts on the surface of the fibers and drains down the outer face of the bed to the sump while the clean gas flows up and out the top of the unit.

Foam blanket: The type of chemical fume suppressant that generates a layer of foam across the surface of a solution when current is applied to that solution. Foam blankets do not prevent the formation of chromic acid mist, but instead trap the mist (hydrogen and water) formed under a blanket of foam. Foam blanket additives do not normally reduce surface tension of the solution.

Hard chromium: The form of chromium in a valence state of +6.

Hard chromium electroplating: Also known as industrial chromium electroplating. A process by which a thick layer of chromium is "electrodeposited" on a base material. This thick layer of chromium creates a surface on the base material for functional purposes, such as providing wear resistance, a low coefficient of friction, hardness, and corrosion resistance. Examples of hard chromium electroplating products are hydraulic cylinders and industrial rolls. There are both large and small hard chromium electroplating facilities and the large facilities are subject more stringent requirements.

Hazardous air pollutant: Title III of the Federal Clean Air Act Amendments identifies 189 substances as hazardous air pollutants ("HAPs"). Under Title III, sources that emit one or more HAP may be required to comply with maximum achievable control technology ("MACT") standards. These standards are based upon the best demonstrated control technology or practices used by the regulated industry.

Hexavalent chromium: The form of chromium in a valence state of +6.
Hexavalent chromium (chromic acid) process: One of the two different types of processes available for decorative chromium electroplating facilities. The process used for electro-deposition of a thin layer of chromium into a base material utilizing a chromic acid solution. Chromic acid is the common name for chromium anhydride (CrO_3).

Initial startup date: The day the tank goes on-line for use in the manufacturing operations. This does not include the period of time before it is used in manufacturing when the tank is being tested.

Large, hard chromium electroplating facility: A facility that performs hard chromium electroplating and has a maximum cumulative potential rectifier capacity greater than or equal to sixty (60) million ampere-hours per year (amp-hr/yr).

Major source: Any stationary source or group of stationary sources which meets the following requirements: 1) is located within a contiguous area; 2) is under common control ("common control" means the tank is controlled along with other tanks or sources governed by this regulation); **and** 3) if it emits or has the potential to emit, considering controls, ten (10) tons per year or more of any one type of hazardous air pollutant; **or** 4) if it emits or has the potential to emit, considering controls, twenty five (25) tons per year or more of any combination of hazardous air pollutants.

Maximum achievable control technology ("MACT"): Emission limitations based upon the best demonstrated control technology or practices to be applied to major sources emitting one or more of the federally listed hazardous air pollutants.

Maximum cumulative potential rectifier capacity: The summation of the total installed rectifier capacity of the hard chromium electroplating tanks at a facility. The capacity is expressed in amperes, multiplied by the maximum potential operating schedule of eight thousand and four hundred (8,400) hours per year, multiplied by 0.7 (which assumes that electrodes are energized seventy percent (70%) of the total operating time). The maximum potential operating schedule is based upon operating twenty four (24) hours per day, seven (7) days per week, and fifty (50) weeks per year. The equation is:

$$(\Sigma C_R)(8{,}400)(0.7) = \frac{\text{ampere hours}}{\text{year}}$$

National Ambient Air Quality Standards: Air quality standards established by U.S. EPA that apply to outside air throughout the country.

National Emission Standards for Hazardous Air Pollutants ("NESHAPs"): Emission standards set by U.S. EPA for air contaminants not covered by National Ambient Air Quality Standards that may cause an increase in deaths, serious irreversible or incapacitating illness.

New tank or source: A source for which construction or reconstruction began after U.S. EPA first proposed a relevant emission standard. There are two different categories of "new sources." First is a chromium electroplating and chromium anodizing source that newly constructed or reconstructed with an initial startup after December 16, 1993 (date emission standard was proposed) but before January 25, 1995 (date emission standard was approved). Second, is a chromium electroplating and chromium anodizing source with a startup date after January 25, 1995 (date emission standard was approved).

Malfunction: Any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures caused by poor maintenance or careless operation are not malfunctions.

Operating parameter value: A minimum or maximum value established for a control device or process parameter that, if achieved by itself or in combination with one or more other operating parameter values, determines that an owner or operator is in continual compliance with the applicable emission limitation or standard.

Operator: Encompasses “owner” for purposes of this Chapter 1.0. Any person who owns, leases, operates, controls or supervises a stationary source.

Packed bed scrubber: An add-on air pollution control device that consists of a single or double packed bed that contains material onto which the chromic acid drops attach. The packed bed section of the scrubber is followed by a mist eliminator to remove any water entrained from the packed bed section. It is typically used to reduce emissions of chromic acid mist from electroplating and anodizing tanks.

Permitting authority: APCD and local agency, and the U.S. EPA for Title V Operating Permits.

Potential to emit: The maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational restriction on the capacity of a source to emit a pollutant shall be treated as part of its design if the limitation or the effect it would have on emissions can be enforced and is federally enforceable. In other words, the potential to emit of a source (tank) is the most chrome a chromium electroplating tank can emit considering the: air pollution control equipment, restrictions on hours of operation, and restrictions on the amount or type of material combusted, stored, or processed. Other restrictions or limitations can also be considered.

Process parameter: Indication of how the source can meet the required emission limits. The parameters that are set when the operator does the initial performance test. If the source can operate with the process parameters, then it is assumed that the source is meeting the emission limit requirements.

Reconstructed source: A major physical change in a facility so as to virtually replace it or substantially increase its capacity. For chromium electroplating, it is the replacement of tank components, which were replaced to an extent that the fixed capital cost of the new components exceeded fifty percent (50%) of the fixed capital cost that would be required to construct a comparable new source. In addition, it must be technologically and economically feasible for the tank to meet the requirements of the final rule.

Rectifier: A device that converts alternating current into direct current by permitting a considerable flow of current in one direction.

Research or laboratory operation: An operation whose primary purpose is for research and development of new processes and products. Operations must be conducted under the close supervision of technically trained personnel. The operation cannot be involved in the manufacture of products for commercial sale, except in a de minimis manner.

Responsible official: For a corporation: president, vice president, secretary, treasurer, or any other person who performs policy or decision making functions similar to these officers, or a duly appointed representative. For a partnership or sole proprietorship: a general partner or proprietor, respectively. For a municipality, State, or Federal agency: a principle executive officer or ranking elected official.

Shutdown: The cessation of operation of a chromium electroplating or chromium anodizing tank for any reason.

Small, hard chromium electroplating facility: A facility that performs hard chromium electroplating and has a maximum cumulative potential rectifier capacity less than sixty (60) million ampere-hours per year (amp-hr/yr).

Stalagmometer: A device used to measure surface tension.

Startup: The setting in operation of a chromium electroplating or chromium anodizing tank for any reason.

Stationary source: Any building, structure, facility, or installation that emits or may emit any air pollutant.

Surface tension: The property that exists in the surface film of all liquids and tends to prevent liquid from spreading. In other words, it is the property of a liquid in contact with air or vapor that makes it behave as if it were covered with a thin membrane under tension. For example, if you were to fill a glass of water and carefully place a thin razor blade onto the top of the water, it would float for a short time due to this pseudo-membrane that supports it. There are three different devices used to test the surface tension: stalagmometer, tensiometer (ring method), and capillary tube.

Tank operation: The time in which current and/or voltage is being applied to a chromium electroplating tank or a chromium anodizing tank.
Tensiometer (ring method): A device used to measure surface tension.

Test method: The approved procedure for sampling, preparing, and analyzing for chromium emissions specified in this regulation.

Title V Operating Permit: Any permit issued, renewed, or revised based upon Title V of the Federal Clean Air Act and located in Regulation 3 Part C of Colorado’s air quality regulations.

Trivalent chromium: The form of chromium in a valence state of +3.

Trivalent chromium electroplating process: One of the two different types of processes available for decorative chromium electroplating facilities. The process used for electro-deposition of a thin layer of chromium into a base materia utilizing a trivalent chromium plating solution instead of a chromic acid solution.

Wetting agent: The type of chemical fume suppressant that reduces the surface tension of a liquid. Wetting agents reduce or inhibit misting by lowering the surface tension of the bath. When the surface tension of the solution is reduced, gases escape at the surface of the solution with less of a “bursting” effect. Thus, less mist is formed.

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Addendum A

Measuring Velocity Pressure and Pressure Drop

1.0 Measuring Pressure Drop

To measure the pressure drop across an add-on air pollution control device, the operator must follow several steps. See the diagram on the next page for an illustration of the equipment used.

First, pressure taps must be installed at any of the following locations:

1) at the inlet and outlet of the control system; the inlet tap should be installed in the ductwork just prior to the control device and the corresponding outlet pressure tap should be installed on the outlet side of the control device prior to the blower or on the downstream side of the blower; **or**
2) on each side of the packed bed within the control system or on each side of each mesh pad within the control system; **or**
3) on the front side of the first mesh pad and back side of the last mesh pad within the control system.

The pressure taps must be sited at locations that are free from pluggage (clogs or obstructions) and away from anything that changes the flow (i.e., cyclonic demisters, baffle, reduction in diameter, expansion in diameter, fan). The pressure taps must also be situated such that no air outside the system can infiltrate at the measurement site and bias the measurement. The operator must follow the manufacturer's recommendations closely. Thus, the operator must have the manufacturer's directions on hand demonstrating how to put the pressure taps on properly. Thus, an Inspector can request the directions to determine whether the operator is properly attaching the pressure taps.

Pressure taps must be constructed of either polyethylene, polybutylene, or other nonreactive materials. Nonreactive plastic tubing shall be used to connect the pressure taps to the device used to measure the pressure drop. The following pressure gauges can be used to monitor the pressure drop: magnetic gauge, inclined manometer, or "U" tube manometer. Prior to connecting any pressure lines to the pressure gauge(s), every gauge must be zeroed out. No calibration of the pressure gauges is required.

Second, the operator must wait the amount of time indicated in the manufacturer's directions for the pressure gauge to fill.

Third, the operator measures the pressure at the inlet of the control system, on one side of the packed bed, or at the front side of the first mesh pad within the control system.

Fourth, the operator measures the pressure at the outlet of the control system, on the other side of the packed bed, or at the back side of the last mesh pad within the control system.

Fifth, the operator subtracts the second reading from the first reading as such:

	First Measurement		Second Measurement		
1.	inlet of the control system	x	outlet of the control system	=	pressure drop
2.	on one side of the packed bed	x	on the other side of the packed bed	=	pressure drop
3.	front side of the first mesh pad	x	back side of the last mesh pad	=	pressure drop

Sixth, the resulting pressure drop is recorded in the operator's monitoring data record book.

2.0 Measuring Velocity Pressure

To measure the velocity pressure at the inlet to an add-on air pollution control device, the operator must follow several steps. You will need a calculator do measure the velocity pressure. See the diagram located after this explanation for an illustration of the equipment used.

First, the operator must locate a piece of duct that connects the hooding of the plating tank(s) with the control device. The operator must determine diameter of that duct. If it is a round duct, simply measure across the opening. If it is a square or rectangular duct the diameter is measured by the following equation:

$$D = \frac{2LW}{(L+W)}$$

L = length
W = width

In other words, measure the length of the rectangle and the width. Multiply two times the length times the width. Then divide that number by the length added to the width.

Second, multiply diameter by 2.5.

Third, determine if there is a straight duct equaling the diameter x 2.5. This means there cannot be any bends or obstructions in the duct used to measure the velocity pressure. The reason this distance is necessary is because the test port (opening for measurement) must be where the flow is in a straight lined path (laminar flow).

Fourth, if there is a straight duct equaling the diameter x 2.5, multiply the diameter x 2. Take that measurement and measure that distance back from the opening down the duct and mark that distance. This is where the first port (opening for measurement) should be located. Next, multiply the diameter x 0.5. Take that measurement and measure that distance back from the opening down the duct and mark that distance. This is where the second port (opening for measurement) should be located. This second port must be located as close to the control system as possible.

Inlet to duct ≥ D x 2.5 Duct opening to control device
--------> (flow) D
↑ port ↑
≥ D x 2 ≥ D x .5

Fifth, if there is not a straight, unobstructed length of duct equaling the diameter x 2.5, then multiply the diameter by 0.8. Take that measurement and measure that distance back from the opening down the duct and mark the distance. This is where the first port (opening for measurement) should be located. Next, multiply the diameter x 0.2. Take that measurement and measure that distance back from the opening down the duct and mark that distance. This is where the second port (opening for measurement) should be located.

Inlet to duct ≥ D x 2.5 Duct opening to control device
--------> (flow) D
↑ port ↑
≥ D x .8 ≥ D x .2

Sixth, take the pitot tube (S shaped instrument) and insert it into the duct through the port (opening for measurement). The pitot tube must be used according to manufacturer’s directions. The operator must have the manufacturer’s manual on site and the Inspector should ask for it when determining whether the operator is properly taking velocity pressure measurements. It is critical that the opening on the pitot tube (S shaped instrument) face into the flow of the emission stream.

Seventh, the operator shall conduct a twelve point velocity traverse of the duct to the control device along a single axis (according to Method 2 [40 CFR part 60, appendix A]) using the pitot tube (S shaped instrument). In English, this means the operator should put twelve pieces of tape up the pitot tube (EPA Method 1). These twelve points are where the operator will take readings. The operator will place the pitot tube in the port and stop at the first tape and measure the velocity pressure value and record that value. The velocity pressure value is found on the bottom curve of the pitot tube. This will continue for the next eleven pieces of tape on the pitot tube. EPA Methods 1 and 2 are attached to this explanation and the operator should be familiar with the procedures.

Eighth, the operator determines the square root of each of the individual twelve velocity pressure values recorded and writes them in the record book. These twelve values are added together and divided by twelve (averaged).

Ninth, the operator looks at the twelve square root values and finds the square root value that comes closest to the average square root value. The chosen square root value is the point of average velocity. (The velocity pressure value measured for this point during the initial performance test will be used as the reference for future monitoring.)

Note: The operator does not need to measure the barometric pressure and duct temperature at each traverse point, but it is recommended by U.S. EPA.

Addendum B

U.S. EPA Method 306B
Surface Tension Measurements and Recordkeeping for Tanks Used at Decorative Chromium Electroplating and Anodizing Facilities

Method 306B - Surface Tension Measurement and Recordkeeping
for Chromium Plating Tanks Used at
Electroplating and Anodizing Facilities

1. Applicability and Principle

1.1 Applicability. This method is applicable to all decorative plating and anodizing operations where a wetting agent is used in the tank as the primary mechanism for reducing emissions from the surface of the solution.

1.2 Principle. During an electroplating or anodizing operation, gas bubbles generated during the process rise to the surface of the tank liquid and burst. Upon bursting, tiny droplets of chromic acid become entrained in ambient air. The addition of a wetting agent to the tank bath reduces the surface tension of the liquid and diminishes the formation of these droplets.

2. Apparatus

2.1 Stalagmometer. Any commercially available stalagmometer or equivalent surface tension measuring device may be used to measure the surface tension of the plating or anodizing tank liquid.

2.2 Preciser tensiometer. A Preciser tensiometer may be used to measure the surface tension of the tank liquid provided the procedures specified in ASTM Method D 1331-89 are followed.

3. Procedure

3.1 The surface tension of the tank bath may be measured by using a Preciser tensiometer, a stalagmometer or any other device suitable for measuring surface tension in dynes per centimeter. If the Preciser tensiometer is used, the instructions given in ASTM Method D 1331-89 must be followed. If a stalagmometer or other device is used to measure surface tension, the instructions that came with the measuring device must be followed.

3.2 Measurements of the bath surface tension are done using a progressive system which minimizes the number of surface tension measurements required when the proper surface tension is maintained. Initially, measurements must be made every 4 hours of tank operation for the first 40 hours of tank operation after the compliance date. Once there are no exceedances during 40 hours of tank operation, measurements may be conducted once every 8 hours of tank operation. Once there are no exceedances during 40 hours of tank operation, measurements may be conducted once every 40 hours of tank operation on an on-going basis, until an exceedance occurs. The maximum time interval for measurements is once every 40 hours of tank operation.

If a measurement of the surface tension of the solution is above the 40 dynes per centimeter limit, the time interval reverts back to the original monitoring schedule of once every 4 hours. A subsequent decrease in frequency would then be allowed according to the previous paragraph.

4. Recordkeeping

4.1 Log book of surface tension measurements and fume suppressant additions. The surface tension of the plating or anodizing tank bath must be measured as specified in section 3.2. The measurements must be recorded in the log book. In addition to the record of surface tension measurements, the frequency of fume suppressant maintenance additions and the amount of fume suppressant added during each maintenance addition will be recorded in the log book. The log book will be readily available for inspection by regulatory personnel.

4.2 Instructions for apparatus used in measuring surface tension. Also included with the log book must be a copy of the instructions for the apparatus used for measuring the surface tension of the plating or anodizing bath. If a Preciser tensiometer is used, a copy of ASTM Method D 1331-89 must be included with the log book. If a stalagmometer or other surface tension measuring device is used, the instructions that came with the apparatus must be included with the log book.

Addendum C

Conducting Surface Tension Measurements for Compliance with Chromium MACT

1.0 Introduction

Surface tension is the property of a liquid in contact with air or vapor that makes it behave as if it were covered with a thin membrane under tension. For example, if you fill a glass of water, and carefully place a thin razor blade onto the top of the water, it would float for a short time due to this pseudo-membrane that supports it. This "tension" at the surface results from intermolecular forces within the solution that cause the exposed surface to contract to the smallest possible area. This is because a molecule in the interior of a solution interacts with other molecules equally from all sides. Whereas a molecule at the surface of liquid is only affected by the molecules below it. The property of surface tension is responsible for the formation of liquid droplets, soap bubbles, and menisci (the curved upward or downward appearance of a column of liquid). Surface tension is defined as the force acting over the surface of the solution per unit length of the surface perpendicular to the force. It is usually measured in dynes per centimeter.

U.S. EPA included the surface tension requirement in the chromium MACT, because during chromium plating gas bubbles generated during the process rise to the surface of the tank solution and burst. Upon bursting, tiny droplets of chromic acid become entrained in the air and are emitted. The greater the surface tension of a solution, the larger the droplets will become. Consequently, more chromic acid is emitted. Surfactants (wetting agents) are surface active agents that reduce the surface tension of a liquid and diminishes the formation of these droplets. Most fume suppressants contain a surfactant.

1.1 EPA's Method 306B

The chromium MACT for decorative chromium electroplaters has provided an option of consistently meeting 45 dynes per centimeter for compliance in EPA's Method 306B. The surface tension of water is approximately 73 dynes per centimeter. The surface tension of a 33 ounce per gallon chromium electroplating solution (without a fume suppressant) has a surface tension around 70 dynes per centimeter.

1.2 Frequency of Measurements

Frequent surface tension measurements of the electroplating bath are required initially. Up to one (1) time every four (4) hours for the first forty (40) hours of operation. The frequency of measurements decreases as compliance is maintained. If at any time one measurement is higher than 45 dynes per centimeter, the frequency of measurements must resume to once every four (4) hours.

1.3 Techniques of Measurement

There are dynamic and static ways of measuring surface tension. Dynamic techniques measure the way the surface tension of a fluid changes in relation to the surface tension of a different fluid -- such as measurements taken by a stalagmometer. Static techniques of measurement examine surface tension in equilibrium -- such as those taken by a tensiometer.

Method 306B allow surface tension to be measured by using a stalagmometer, a tensiometer, or "any other device suitable for measuring surface tension." The instructions from the manufacturer of the device must be kept with the log book.

2.0 Tensiometer

The oldest and most familiar method of measuring surface tension is with the du Nouy precision tensiometer -- the ring method. Tensiometers are essentially torsion balances that apply a slowly increasing force to a platinum-iridium ring in contact with the surface of the liquid being measured. The tensiometer pulls on the ring on the surface of the solution and measures the force it takes to "break" it from the surface. This force is proportional to surface tension. The amount of the force is indicated upon a graduated scale. When the scale is calibrated it give readings in dynes of force per centimeter. If an operator uses a tensiometer U.S. EPA requires the operator follow the standard test method ASTM D1331-56.

The pull on the tensiometer ring is obtained by applying a torque to a fine wire. The wire is fixed at one end and attached at the other end to the movable index. The movable index is driven by a small gear. An arm of steel tubing clamped to the center of the torsion wire applies the force to the ring suspended from its outer end. The theory of the ring method of surface tension measurements depends upon the ring being wet by the liquid in which it is immersed.

An operator must have the following equipment to use a tensiometer for surface tension measurements:

- a tensiometer with an undamaged platinum ring
- a clean sampling container
- a Bunsen burner
- a pair of forceps
- a calculator
- a calibrating weight
- a thermometer
- 50 mL of plating solution
- 50 mL of methyl alcohol (flammable)

To obtain an accurate measurement using a tensiometer the platinum ring must be free of dirt and bends. The platinum ring is the most critical component of the tensiometer and should always be handled with forceps. Prior to beginning the test the operator should rinse the ring once with methyl alcohol and then three times with deionized water. Then it should be placed over the flame of a Bunsen burner (or similar source of heat) for a short time. The ring should be cooled prior to beginning the test.

2.1 Calibration of a Tensiometer

The tensiometer must be calibrated. The operator may first need to adjust the length of the torsion arm so that the dial scale will read directly in dynes per centimeter. The tensiometer must be level (bolt to flat platform or clamp to the bench top being used). Slowly pull the wire tight with the tension knob and adjust the reading and the vernier to zero. Insert the platinum metal ring in the holder, and carefully place an accurately measured weight (no less than 500 mg and no greater than 800 mg) across the ring. Then the read adjusting screw must be turned until the index level of the arm is opposite the reference line of the mirror. The operator should then record the dial reading. The following equation is used to calibrate a tensiometer:

$$y = (M \times g) / 2L$$

(y - surface tension in dynes per centimeter; M - weight placed on ring in grams; g - gravity constant (980.3 in Chicago); L - circumference of ring (usually 4 centimeters)). If the recorded reading is greater than the calculated value, the tensiometer must be adjusted by shortening the torsion arm. If the reading is less than the calculated value the arm needs to be lengthened. After adjusting the arm, the operator should recalibrate the tensiometer using the same procedure as before until the recorded value matches the calculated value.

2.2 Procedure to Use a Tensiometer

Prior to beginning a test, the operator should note the concentration of the chromium plating solution, and the quantity of surfactant used. The plating solution must also be physically homogeneous, particularly with solutions containing surface-active material in order to avoid unrepresentative measurement. The operator should record the temperature of the liquid, and the date that the bath was last made-up. The surface tension of chromium plating solutions and other liquid increases with a decrease in temperature and visa-versa. It is necessary to report the temperature of the liquids.

After the operator has cleaned and calibrated the tensiometer, he/she can begin the test by following these steps:

1) verify that the tensiometer is level and insert the clean platinum ring;
2) place the solution to be tested into a clean sample vessel and place that vessel onto the sample platform;
3) raise the platform with the adjusting screw until the ring is submerged;
4) once the ring is submerged, lower the platform slowly, while simultaneously applying torsion to the wire with the dial adjusting knob;
5) these simultaneous adjustments must be carefully proportioned so that the ring system remains constantly in its zero position;
6) as the “breaking point” between the solution and the ring approaches, the operator must make slower, smaller, and more careful adjustments to the tensiometer; and
7) when the solution “breaks” (when it detaches from the ring), the operator must stop making adjustments and record the dial reading.

The operator must make at least two measurements. More measurements should be taken if the variation between the readings is large.

2.3 Calculation of Surface Tension with a Tensiometer

The dial reading obtained in the procedure section, is actually an uncorrected or “apparent” surface tension reading. The reading must be corrected for the resistance at the contours of the liquid surface in the area of the ring at the instant of breakaway. This resistance causes a slightly higher surface tension reading. This correcting factor (“F”), is usually too small to vary the whole number measured directly from the tensiometer.

2.4 Advantages and Disadvantages in Using a Tensiometer

The du Nouy tensiometer is the easiest and most accurate method of measuring surface tension. It only requires a small amount of solution for the measurement. However, it can be very expensive to purchase a tensiometer. Basic models are $2,000 to $3,000, but can run as much as $12,000 for more sophisticated pieces. In addition, the operator must take extreme care to avoid any damage to the platform ring. Even a slight bend in the ring can be costly ($300 to replace). Another limitation is that there cannot be any vibrations during testing. If there are machines that vibrate in the facility, it can cause the solution to “break” sooner, thus yielding erroneous tensiometer readings.

The other types of tensiometers that are available are typically significantly more expensive than the du Nouy tensiometer. The Wilhelmy Plate method uses a vertical plate of known perimeter that is attached to a balance, and the force due to wetting is measured. The Bubble Pressure method measures the maximum pressure of a bubble produced in the fluid and relates this pressure to surface tension. The Pendant Drop method is similar to the stalagmometer, but analyzes the geometry of each drop optically and relates this to surface tension.

3.0 Stalagmometer

A stalagmometer is a piece of equipment that uses a “dripping” technique for measuring surface tension. This method is also known as the “drop weight” method of measuring surface tension because drops of solution drip from the tip of the stalagmometer and are counted to measure the surface tension of the solution. A stalagmometer is basically a pipette with a wide flat tip that allows large droplets of reproducible size to form slowly, and finally drop. The weight of each drop is calculable from the total volume of the pipette, form the number of drops that fall, and from the density of the sample. For practical purposes, however, it is easier to count the number of drops which fall, the density of the sample, and the surface tension of water which is used as a reference liquid for factory standardization of the stalagmometer.

A surface tension reading using a stalagmometer takes approximately a half hour, including cleaning of the equipment. Cleaning of the stalagmometer is crucial to getting an accurate reading. In order to get set up for this test, the operator must have the following equipment:

1) one stalagmometer,
2) one ring stand,
3) one rubber bulb with a three way valve,
4) one thermometer clamp,
5) one base stand,
6) one hydrometer for chromium,
7) six 150 mL beakers,
8) gloves and personal protective equipment, and
9) a device for counting droplets (optional).

Most suppliers of stalagmometers will be able to provide the operator with a “package” for a little more money that includes the base stand, ring stand, thermometer clamp, rubber bulb, and any other equipment needed. The operator must have the following solutions:

1) 150 mL chromium plating solution taken directly from the bath,
2) 150 mL concentrated nitric acid,
3) 150 mL methyl alcohol, and

4) 150 mL deionized water.

Due to the use of concentrated nitric acid and other chemicals, the operator should wear the appropriate personal protective equipment (i.e., gloves, safety glasses, lab coat), when conducting this test. Also, this test should be conducted underneath a ventilated hood, because the nitric acid can emit noxious fumes.

3.1 Cleaning the Stalagmometer

A clean stalagmometer is crucial to a successful surface tension reading. The operator should have received directions on cleaning from the manufacturer of the stalagmometer. To clean the stalagmometer, it must be placed into the stand. Under a ventilated fume hood, 150 mL of concentrated nitric acid is placed into the beaker. The lower end of the stalagmometer must be immersed deep into the beaker of nitric acid (if it is not deep enough the operator may have to start over). The rubber bulb must be squeezed and when collapsed, placed on the top end of the stalagmometer. The operator must carefully release the bulb, and slowly draw in the nitric acid past the top etched line on the stalagmometer. The nitric acid must remain in the stalagmometer for five minutes. After five minutes, the operator should raise the stalagmometer in the stand so that the lower tip is out of the nitric acid solution. Next, the bulb is removed and the solution drained back into the beaker. The stalagmometer can be turned upside down for faster draining, but care must be taken not to spill any solution. After the nitric acid is drained, the stalagmometer must be rinsed, using the same procedure above, three to four times with deionized water until the inside of the stalagmometer is “water break” free. Using the same procedure, the stalagmometer must be rinsed with methyl alcohol and allowed to dry completely (about five minutes).

3.2 Test Procedure

First a 150 mL beaker must be filled with solution taken directly form the chromium plating tank. The specific gravity of the chromium plating solution is measured using a hydrometer. This measurement will be used in the calculation so it must be written down.

Second, using the same procedure for cleaning the stalagmometer, the lower tip of the stalagmometer must be immersed deep into the chromium solution. The tip of the stalagmometer is wiped by touching it against the side of a beaker. The finger tip is released to allow the solution to drain, and the operator must count the number of drops of solution that fall into the beaker. This must be done until the solution in the stalagmometer reaches the bottom etched line. The operator must write down the number of drops.

3.3 Calculating Surface Tension with a Stalagmometer

After the test is conducted, the operator should have written down: the number of drops of sample counted, the water drop number engraved on the stalagmometer, the density of the sample measured with the hydrometer, the density of water at 25° C, and the surface tension of water at 25° C. Surface tension measured with a stalagmometer can be calculated with the following equation:

$$S = \frac{(Sw)\,(Nw)\,(D)}{(N)}$$

S = surface tension of the sample in dynes / centimeter
Sw = surface tension of water (73)
N = number of drops of sample counted
Nw = water drop number engraved on the stalagmometer
D = density of sample in grams / mL

Surface tension measured with a stalagmometer can be calculated by plugging the gathered information into the above equation. The number obtained from the equation is the surface tension of the solution in dynes per centimeter.

3.4 Advantages and Disadvantages of Stalagmometers

Stalagmometers are inexpensive, easy to use, and easy to replace. Unfortunately, the process may take up to an hour to complete, because of the cleaning and calculations that are required. For those facilities that will be monitoring every four hours, the time factor for conducting this type of test may not be cost effective in the long run.

Addendum D

Sample
Operation and Maintenance Checklists for:

Composite Mesh-Pad Systems or
Combination Packed-Bed Scrubber and Composite Mesh Pad Systems

Packed-Bed Scrubber Systems

and

Fiber-Bed Mist Eliminators

Operation and Maintenance Checklist for Composite Mesh-Pad Systems or Combination Packed-Bed Scrubber and Composite Mesh Pad Systems

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

Note: This checklist contains only the minimum requirements and does not include all of the system checks that need to be performed to ensure proper operation of the control system. Facilities should incorporate information recommended by the control system vendor.

Plant Name / Location: ______________________________

Control Device ID No.: ______________________________

Installation Date: ____/____/____

Date of Last Performance Test: ____/____/____

Tanks Ducted to Control System:

Tank ID #	Type of Tank (i.e., hard chrome, decorative chrome, or chrome anodizing

Inspection and Maintenance Checklist: (insert Inspector's initials in boxes)

Control Device Inspection	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____
Inlet and outlet transition zones				
Spray nozzles				
Packed-bed section				
Mesh pads				
Drain lines				
Fan motor				
Fan vibration				

Monitoring Equipment Inspection	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____

Pressure lines connected				
Pressure drop monitor calibrated				

Control Device Maintenance	Date: ____/____/___	Date: ____/____/___	Date: ____/____/___	Date: ____/____/___
Washdown of pads				
Other: (specify)[1]				

[1] For example: replaced nozzles, adjusted fan motor, replaced recirculation pump, etc.

Corrective Actions:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

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Date: ____/____/_____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

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Date: ____/____/_____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

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Operation and Maintenance Checklist
for packed-bed scrubbers

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

Note: This checklist contains only the minimum requirements and does not include all of the system checks that need to be performed to ensure proper operation of the control system. Facilities should incorporate information recommended by the control system vendor.

Plant Name / Location: ____

Control Device ID No.: ____

Installation Date: ____/____/____

Date of Last Performance Test: ____/____/____

Tanks Ducted to Control System:

Tank ID #	Type of Tank (i.e., hard chrome, decorative chrome, or chrome anodizing

Inspection and Maintenance Checklist: (insert Inspector's initials in boxes)

Control Device Inspection	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____
Inlet and outlet transition zones				
Spray nozzles				
Packed-bed section				
Overhead weir				
Drain lines				
Fan motor				
Fan vibration				

Monitoring Equipment Inspection	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____
Pressure lines connected				

Pressure drop monitor calibrated				
Pitot tube[1]				

[1] 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.

Control Device Maintenance	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____	Date: ____/____/____
Other: (specify)[2]				

[2] For example: replaced nozzles, adjusted fan motor, replaced recirculation pump, etc.

Corrective Actions:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

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Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

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Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

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Date: ____/____/____

Initials: ____________

Supervisor informed (yes/no): ___________

Description: ______________________________

Date: ____/____/____

Initials: ____________

Supervisor informed (yes/no): ___________

Description: ______________________________

Operation and Maintenance Checklist
for Fiber-Bed Mist Eliminators

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

Note: This checklist contains only the minimum requirements and does not include all of the system checks that need to be performed to ensure proper operation of the control system. Facilities should incorporate information recommended by the control system vendor.

Plant Name / Location: ______________________________

Control Device ID No.: ______________________________

Installation Date: ___/___/___

Date of Last Performance Test: ___/___/___

Tanks Ducted to Control System:

Tank ID #	Type of Tank (i.e., hard chrome, decorative chrome, or chrome anodizing

Inspection and Maintenance Checklist: (insert Inspector's initials in boxes)

Control Device Inspection	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___
Inlet and outlet transition zones				
Spray nozzles				
Fiber beds				
Prefiltering device				
Drain lines				
Fan motor				
Fan vibration				

Monitoring Equipment Inspection	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___
Pressure lines connected				

Pressure drop monitor calibrated				

Control Device Maintenance	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___
Washdown of fiber beds				
Other: (specify)[1]				

[1] For example: replaced nozzles, adjusted fan motor, replaced recirculation pump, etc.

Corrective Actions:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ____/____/____ Initials: ___________ Supervisor informed (yes/no): ___________

Description: ____

Date: ____/____/____ Initials: ___________ Supervisor informed (yes/no): ___________

Description: ____

Date: ____/____/____ Initials: ___________ Supervisor informed (yes/no): ___________

Description: ____

Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

Date: ____/____/____ Initials: ____________ Supervisor informed (yes/no): ___________

Description: ____

Addendum E

Sample
Monitoring Data Form

Monitoring Data Form

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

Plant Name / Location: ______________________________

Air Pollution Control System: ______________________________

Control Device ID No.: ______________________________

Monitoring Data:

Pressure drop across system[1]				Velocity pressure of system inlet[2]		
Inches of H_2O column	Date recorded	Initials		Inches of H_2O column	Date recorded	Initials
Applicable range established during initial performance test: ______________________________				Applicable range established during initial performance test: ______________________________		

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[1] Pressure drop monitoring is required for composite mesh-pad (CMP) systems, packed-bed scrubbers (PBS), combination CMP/PBS, and fiber-bed mist eliminators (including the upstream control device used to prevent plugging). A continuous strip recorder may be added to the _P monitor to continuously record pressure drop.

[2] Velocity pressure monitoring is required for PBS only.

Periods of Excess Emissions Recorded:

Start:______________________________

End:______________________________

Corrective action taken:______________________________

______Initials:______________________________

Start:______________________________

End:______________________________

Corrective action taken:______________________________

______Initials:______________________________

Start:______________________________

End:______________________________

Corrective action taken:______________________________

______Initials:______________________________

Start:______________________________

End:______________________________

Corrective action taken:______________________________

______Initials:______________________________

Start:______________________________

End:______________________________

Corrective action taken:______________________________

______Initials:______________________________

Start:______________________________

End:______________________________

Corrective action taken:______________________________

______Initials:______________________________

Start:______________________________
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Addendum F

Sample
Notification of Construction or Reconstruction

Notification of Construction or Reconstruction

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

1. This form is being completed because (indicate yes/no)

_____ A chromium electroplating and/or chromium anodizing tank is being constructed.
_____ A chromium electroplating and/or chromium anodizing tank is being reconstructed.

2. Print or type the following for each plant in which a chromium electroplating and/or chromium anodizing tank is being constructed or reconstructed.

Owner/Operator/Title: ____
____

Street Address: ____
____

City: ____ State:________________________________
__________ Zip code:______________________________Plant Name: _______________________________________
____ Plant Phone Number: _________________________________Plant
Contact/Title: ____
____

Plant Address (if different from owner/operator's): Street Address: _______________________________________
____

City: ____ State:________________________________
____________ Zip code:___________________________

3. Complete this section for each tank for which construction or reconstruction is planned. If additional lines are required make copies of this page.

Tank ID #	Type of tank	Expected start date for const/reconst	Expected end date for const/reconst	Anticipated startup date	Type of control device to be used[1]	Control System ID #	Estimated total chromium emissions after control applied[2]

[1] Attach design information from vendor, including design drawings and design capacity.
[2] Attach engineering calculations to support estimate. These calculations may be from the vendor. Emissions estimates should be expressed in units consistent with the emission limits in the regulation.

Example Response:

Tank ID #	Type of tank	Expected start date for const/reconst	Expected end date for const/reconst	Anticipated startup date	Type of control device to be used[1]	Control System ID #	Estimated total chromium emissions after control applied[2]

1	hard chrome plating	10/94	1/95	1/95	composite mesh system	5	0.01 mg/dscm
2	decorative chrome plating	2/95	6/95	6/95	wetting agent fume suppressant	N/A	will meet 45 dynes/cm

4. Indicate which of the following will apply after construction or reconstruction occurs (indicate yes/no).

_____ Tanks are located at a facility that is a major source.
_____ Tanks are located at a facility that is an area source.
(Note: a major source is a facility that emits greater than 10 tons per year of any one hazardous air pollutant (HAP) or 25 tons per year of multiple HAPs. All other sources are area sources. The major / area source determination is based upon all HAP emission points inside the facility fence line, not just the chromium electroplating and anodizing tanks.)

5. Indicate which of the following apply if hard chromium electroplating tanks are being constructed or reconstructed (indicate yes/no).

_____ The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____ The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____ Records indicate that the facility's previous twelve-month cumulative current usage for the hard chromium electroplating tanks was less than 60 million amp-hr.
_____ The facility wishes to accept a Federally-enforceable limit of less than 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks.

6. Attach a brief description of the proposed emission control technique(s), including design drawings, design capacity, and emissions estimates with supporting calculations.

7. If reconstruction will occur, attach a brief description of the source and the components to be replaced.

8. Complete the following if reconstruction will occur, and the facility believes that there are economic or technical limitations to prevent the facility from complying with all relevant standards or requirements.

   a. Attach a discussion of any economic or technical limitations of complying with the relevant standards or requirements. The discussion must be sufficiently detailed to demonstrate how these limitations will affect the facility's ability to comply.

   b. Provide an estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new source: Replacement: $ ____________; New source $ ____________

   c. Provide the estimated life of the source after the replacements: ____________

9. Print or type the name and title of the Responsible Officer for the facility:

____
____
(Name) (Title)

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant
2) Owner of the plant;

3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

____

____/____/______________

(Signature of Responsible Official) (Date)

Addendum G

Sample
Initial Notification Report

Initial Notification Report

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title: ____

____

Street Address: ____

____

City: ______________________________ State:__________________

_____ Zip code:________________

Plant Name: ____ Plant

Phone Number: __________________

Plant Contact/Title: ____

______________________________Plant Address (if different from owner/operator's): Street

Address: ____

City: ______________________________ State:__________________

_______ Zip code:________________

1. Complete this section for all affected tanks using a chromic acid bath. If only trivalent chromium baths are used at the facility, do not complete this section and go to section number 3.

   Complete the following table, if additional lines are required make copies of this page.

Tank ID#	Type of tank	Startup date[1]	Total installed rectifier capacity (amps)	Description of parts plated	Applicable emission limit	Compliance date[2]

[1] New or reconstructed tanks with an initial startup date after 1/25/95 must submit a Notification of Construction / Reconstruction form and notify the Administrator of the date construction / reconstruction commenced and the actual startup date in accordance with 40 CFR 63.347 (c)(2).

[2] Compliance dates for existing tanks, tanks which commenced operation on or before 12/16/93:

Hard chromium plating tanks 1/25/97

Decorative chromium plating tanks	1/25/96
Chromium anodizing tanks	1/25/97

Compliance dates for new tanks, tanks for which construction or reconstruction commenced after 12/16/93:

If initial startup occurred between 12/16/93 and 1/25/95	1/25/95
If initial startup occurred after 1/25/95	upon startup

Example Response:

Tank ID#	Type of tank	Startup date	Total installed rectifier capacity (amperes)	Description of parts plated	Applicable emission limit	Compliance date
1	Chrome anodizing	1/1/85	5,000	Aircraft landing gear	45 dynes/cm or 0.01 mg/dscm	1/25/97
2	Hard chrome plating	1/1/85	10,000	Pistons	0.015 mg/dynes	1/25/97
3	Hard chrome plating	1/1/95	12,000	Pistons	0.015 mg/dynes	1/25/95
4	Hard chrome plating	3/1/95	12,000	Pistons	0.015 mg/dynes	3/1/95

Indicate which applies (yes/no):
_____ Tanks are located at a facility that is a major source
_____ Tanks are located at a facility that is an area source
(Note: a major source is a facility that emits greater than 10 tons per year of any one hazardous air pollutant (HAP) or 25 tons per year of multiple HAPs. All other sources are area sources. The major / area source determination is based upon all HAP emission points inside the facility fence line, not just the chromium electroplating and anodizing tanks.)

Indicate which of the following apply if hard chromium electroplating tanks are operated in this facility.

_____ The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____ The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____ Records indicate that the facility's previous twelve-month cumulative current usage for the hard chromium electroplating tanks was less than 60 million amp-hr.
_____ The facility wishes to accept a Federally-enforceable limit of less than 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks.

2. Complete this section for all decorative chromium electroplating tanks using a trivalent chromium bath. If only chromic acid baths are used at the facility, do not complete this section and go to section number 3. Complete the following table, and if additional lines are required make copies of this page.

Tank ID #	Startup date[1]	Description of parts plated	Compliance date[2]

[1] New or reconstructed tanks with an initial startup date after 1/25/95 must submit a Notification of Construction / Reconstruction form and notify the Division of the date construction / reconstruction commenced and the actual startup date.
[2] Compliance dates for existing tanks, tanks which commenced operation on or before 12/16/93: 1/25/96; Compliance dates for new tanks, tanks for which construction or reconstruction commenced after 12/16/93: if initial startup occurred between 12/16/93 and 1/25/95: 1/25/95; if initial startup occurred after 1/25/95: upon startup.

Provide a brief description of the trivalent chromium electroplating process used at your facility. Attach a process flow diagram for each plating line.

Indicate which of the following applies to this facility (indicate yes/no):

_____ The trivalent process used at this facility incorporates a wetting agent
_____ The trivalent process used at this facility incorporates a wetting agent

List below (or attach a list of) the trivalent chromium bath components and clearly identify the wetting agent.

3. Print or type the name and title of the Responsible Officer for the facility:

(Name) (Title)

A Responsible Official can be:
President, vice-president, secretary, or treasurer of the company owning the plant
Owner of the plant
Plant engineer or supervisor

Government official if the plant is owned by Federal, State, City, or County government; or
Ranking military officer if the plant is located in a military base

I certify that information contained in this report to be accurate and true to the best of my knowledge:

____

____/ /______________

(Signature of Responsible Official) (Date)

Addendum H

Sample
Notification of Performance Test

Notification of Performance Test

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title: ____

____

Street Address: ____

____

City: ______________________________ State:____________________

__________ Zip code:______________________

Plant Name: ____ Plant

Phone Number: ______________________

Plant Contact/Title: ____

____Plant Address (if different from owner/operator’s): Street

Address: ____

City: ______________________________ State:____________________

__________ Zip code:______________________

2. Complete the following table, if additional lines are required make copies of this page.

Type of control technique	Control System ID #	ID # of tank ducted to control system	Type of tank	Date of performance test

Example response:

Type of control technique	Control System ID #	ID # of tank ducted to control system	Type of tank	Date of performance test
composite mesh-pad system	10	1	Hard chrome plating	5/15/97
		2	Hard chrome plating	
		3	Hard chrome plating	

packed-bed scrubber	11	4	Hard chrome plating	5/18/97
		5	Hard chrome plating	
wetting agent fume suppressant	N/A	6	Chrome anodizing	none required

Addendum I

Sample
Notification of Compliance Status

Notification of Compliance Status

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title: ____

____

Street Address: ____

____

City: ____ State:______________________________

__________ Zip code:_____________________________

Plant Name: ____ Plant

Phone Number: ______________________________

Plant Contact/Title: ____

____Plant Address (if different from owner/operator’s): Street

Address: ____

City: ____ State:______________________________

____________ Zip code:___________________________

2. Complete the following table, if additional lines are required make copies of this page.

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Method to determine compliance[1]	Test method followed	Type and quantity of HAP emitted[2]

[1] If a performance test was conducted, submit the test report containing the elements required by 40 CFR 63.344(a).

[2] If the compliance procedures of 40 CFR 63.344(e) are being followed, attach the calculations needed to support the emission limits expressed in mg/hr.

Example response:

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Method to determine compliance[1]	Test method followed	Type and quantity of HAP emitted[2]
1	hard chrome plating	0.015 mg/dscm	composite mesh-pad system	10	performance test	EPA Method 306	Cr 0.009 mg/dscm

2	chrome anodizing	45 dynes/cm	wetting agent fume suppressant	N/A	surface tension measurement	EPA Method 306B	Cr 40 dynes/cm
3	decorative chrome plating	0.01 mg/dscm	foam blanket	N/A	performance test	EPA Method 306A	Cr 0.005 mg/dscm

3. Complete the following table for each control technique used. If additional lines are needed, make copies of this page.

Control system ID #	Tank ID # (s)	Range of site-specific operating parameter values[1]			
		Pressure drop	Velocity pressure	Surface tension	Foam blanket thickness

[1] If the applicable monitoring and reporting requirements to demonstrate continuous compliance differ from those in 40 CFR Part 63, Subpart N, attach a description. Parameter value ranges are established through initial performance testing and are those that correspond to emissions at or below the level of the standard(s).

Example response:

Control system ID #	Tank ID # (s)	Range of site-specific operating parameter values[1]			
		Pressure drop	Velocity pressure	Surface tension	Foam blanket thickness
10	1	7 in. w.c. ± 1 in.	N/A	N/A	N/A
N/A	2	N/A	N/A	≤45 dynes/cm	N/A
N/A	3	N/A	N/A	N/A	≥1 inch

4. Complete the following if hard chromium electroplating tanks are operated (indicate yes/no).

_____ The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.

_____ The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.

_____ Records indicate that the facility's previous twelve-month cumulative current usage for the hard chromium electroplating tanks was less than 60 million amp-hr.

_____ The facility wishes to accept a Federally-enforceable limit of less than 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks.

5. Indicate which item describes the facility's compliance status (indicate yes/no).

_____ The facility is in compliance with the provisions of 40 CFR Part 63, Subpart N.

_____ The facility is not in compliance with the provisions of 40 CFR Part 63, Subpart N.

6. Print or type the name and title of the Responsible Officer for the facility:

____

(Name) (Title)

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant;
2) Owner of the plant;
3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that an operation and maintenance plan has been completed and the plan and other work practice standards of 40 CFR 63.342(f) are being followed:

____________________________ / /

(Signature of Responsible Official) (Date)

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

____________________________ / /

(Signature of Responsible Official) (Date)

Addendum J

Sample
Ongoing Compliance Status Report

Ongoing Compliance Status Report

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title: ____

____

Street Address: ____

____

City: ______________________________ State:________________

_____ Zip code:______________

Plant Name: ______________________________________ Plant

Phone Number: ________________

Plant Contact/Title: ____

________________________________Plant Address (if different from owner/operator's): Street

Address: ______________________________________

City: ______________________________ State:________________

______ Zip code:______________

2. Complete the following table, if additional lines are required make copies of this page.

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Operating parameter monitored to demonstrate compliance[1]	Acceptable value or range or values for monitored parameter(s)	Total operating time during reporting period

Example response:

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Operating parameter monitored to demonstrate compliance[1]	Acceptable value or range or values for monitored parameter(s)	Total operating time during reporting period
1	hard chrome plating	0.015 mg/dscm	composite mesh-pad system	10	pressure drop	7 in. w.c. ± 1 in.	1,040 hr

2	chrome anodizing	45 dynes/cm	wetting agent fume suppressant	N/A	surface tension	≤45 dynes/cm	1,040 hr
3	hard chrome plating	0.015 mg/dscm	composite mesh-pad system	10	pressure drop	7 in. w.c. ± 1 in.	1,040 hr

3. Identify the beginning and ending dates of the reporting period: Beginning: ______/______/_______ Ending: ____ __/______/_______4. For hard chromium electroplating tanks that are limiting their maximum cumulative rectifier capacity in accordance with 40 CFR 63.342(c)(2), complete the following table for this reporting period.

Tank ID #	Ampere-hours consumed by month						Total ampere-hours consumed during reporting period
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	
Total for all tanks							

Example response:

Tank ID #	Ampere-hours consumed by month						Total ampere-hours consumed during reporting period
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	
1	400,000	400,000	400,000	200,000	200,000	200,000	1,800,000
3	300,000	300,000	300,000	300,000	300,000	300,000	1,800,000
Total for all tanks	700,000	700,000	700,000	500,000	500,000	500,000	3,600,000

5. Attach all monitoring data forms for the reporting period. Based on the data on excess emissions and the data on operating times, calculate the following hours:

	Hours	Percent of total operating time
Duration of excess emissions caused by:	_________	_____________
	__________	___
Process upsets	_________	_____________
	__________	___
Control equipment malfunctions	_________	_____________
	__________	___
Other known causes	_________	_____________
	__________	___
Unknown causes	_________	_____________
	__________	___
Total duration of excess emissions	_________	_____________

__________ ___

6. Indicate which applies (indicate yes/no).

_____ During this reporting period, the work practices identified in 40 CFR 63.342(f) were followed in accordance with the operation and maintenance plan for this source.

_____ During this reporting period, the work practices identified in 40 CFR 63.342(f) were not followed in accordance with the operation and maintenance plan for this source.

7. If the operation and maintenance plan was not followed during the reporting period, please provide an explanation of the reasons for not following the provisions in the plan, an assessment of whether any excess emissions and/or parameter monitoring exceedances are believed to have occurred, and a copy of the appropriate records documenting that the operation and maintenance plan was not followed. Please state whether or not the plan is being revised accordingly.

8. Please describe any changes in monitoring, processes, or controls since the last reporting period.

9. Print or type the name and title of the Responsible Officer for the facility:

____

(Name) (Title)

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant;
2) Owner of the plant;
3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

____ / / ____________

(Signature of Responsible Official) (Date)