



7 DE Admin. Code 1138

Emission Standards for Hazardous Air Pollutants for Source Categories

Section 6

Chromium Electroplating and Anodizing Tanks

August 4, 2015

Public Hearing Handouts

**Jim Sneed
DNREC
Division of Air Quality**





Public Hearing
August 4, 2015

Emission Standards for Chromium Electroplating and Anodizing Tanks

Section 6 of
7 DE Admin. Code 1138



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Department's Presentation

- Provide **brief background** information on
 - EPA's regulatory efforts to control emission from chromium electroplating & anodizing tanks in 1995 and 2012 (40 CFR Part 63 Subpart N)
 - Department's adoption of comparable requirements in 1999 and 2013 (Regulation 1138 Section 6)
- Department's **currently proposed** regulatory action
- Introduce the public hearing handouts



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Background

On the Development of the Chromium Electroplating & Anodizing Standards (AKA Rules)

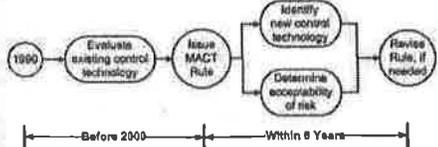


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Clean Air Act Amendments of 1990

- Congress prescribed EPA's rule-making "path forward" – A 2-Phase Rulemaking Process



1990 → Evaluate existing control technology → Issue MACT Rule → Identify new control technology / Determine acceptability of risk → Revise Rule, if needed

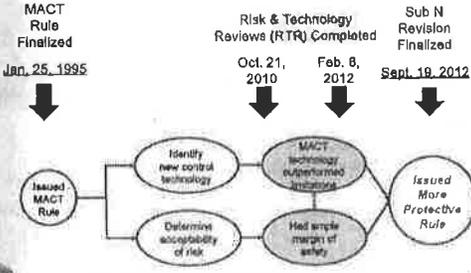
Phase 1: Technology Driven (Before 2000)
Phase 2: Risk Driven (Within 8 Years)



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Federal Chromium Electroplating Rule
40 CFR Part 63 Subpart N



MACT Rule Finalized: Jan. 25, 1995

Risk & Technology Reviews (RTR) Completed: Oct. 21, 2010; Feb. 8, 2012

Sub N Revision Finalized: Sept. 19, 2012

Issued MACT Rule → Identify new control technology / Determine acceptability of risk → MACT technology superimposed on existing / Had ample margin of safety → Issued More Protective Rule



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Delaware's Adoption of MACT Standard
Section 6 of Regulation 1138

- July 1999**
DNREC held public hearings on proposed Section 6
- September 11, 1999**
Section 6 - Final and Effective




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Delaware's Adoption of RTR Standard

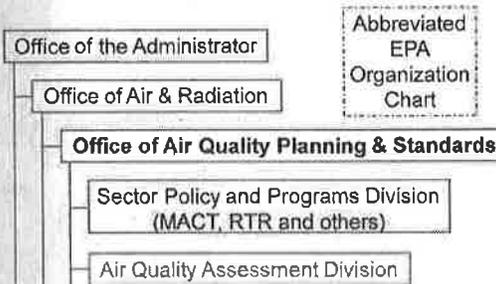
Section 6 of Regulation 1138

- **June 2013**
DNREC held public hearings on proposed revision of Section 6
- **September 11, 2013**
Section 6 - Final and Effective



Which Brings
Us to the EPA Most Recent
Change to Subpart N

So Who Are These New EPA's Rule Writers?



EPA's Air Quality Assessment Division

- Conducts periodic (~ 10 years) reviews of
 - Test methods
 - Performance specifications
 - Testing requirements in standards
- Implements changes to
 - Add newly approved alternatives
 - Delete errors and obsolete provisions



Federal Air Emissions Testing Rule

- **February 27, 2014**
EPA's Air Quality Assessment Division promulgated the Federal Air Emissions Testing Rule that updated . . .
 - 48 test methods
 - 11 performance specifications
 - Testing requirements in 29 emission standards



Federal Chromium Electroplating Rule

- **February 27, 2014**
40 CFR Part 63 Subpart N was one of the 29 standards identified

Subpart N EPA Approved Test Methods

- 63.344(c)(1) • Method 306 in Appendix of 40 CFR Part 63
- 63.344(c)(1) • Method 306A in Appendix of 40 CFR Part 63
- 63.344(c)(2) • California Air Resources Board Method 425
- 63.344(c)(3) • Method 306B in Appendix of 40 CFR Part 63
- 63.344(c)(4) • Case by Case Approval by the EPA
- 63.344(c)(5) • South Coast Air Quality Management District Method 205.1



Federal Chromium Electroplating Rule

February 27, 2014

40 CFR Part 83 Subpart N

- 63.344 Performance test requirements and test methods.
- (c) Test methods. Each owner or operator
- (1)
- (2)
- (3)
- (4)
- (5) The South Coast Air Quality Management District (SCAQMD) Method 205.1 (which is available by contacting the South Coast AQMD, 21885 Copley Dr, Diamond Bar, CA 91765) may be used to determine the total chromium concentration from hard and decorative chromium electroplating tanks and chromium anodizing tanks.



And Now to the Department's Current Activities to Amend Section 6 And to Today's Public Hearing

Delaware's Adoption of Federal Change

- Upon consideration, the Department found the adopting of the Federal change appropriate
 - It provides no burden as the use of the newly approved test method is optional
 - It provides additional flexibility for the Delaware facilities and their testers
 - It maintains the consistency between Delaware requirements with National requirements
 - It may provide improved emissions data quality

DNREC's Proposed Amendment to Section 6

- On April 14, 2015, the Secretary approved the Department's request to amend Section 6 consistent with the **Federal Air Emissions Testing Rule**
- The Department did not conduct public workshops; instead it communicated the planned addition directly to all affected sources and through DNREC website
- On July 1, 2015, the proposed amendment to Section 6 appeared in the Delaware Register of Regulations

Delaware's Adoption of the Testing Change

Regulation 1138 Section 6

- 6.5 Performance test requirements and test methods.
- 6.5.3 Test methods. Each owner or operator
- 6.5.3.1
- 6.5.3.2
- 6.5.3.3
- 6.5.3.4
- 6.5.3.5 The South Coast Air Quality Management District (SCAQMD) Method 205.1, dated August 1991, may be used to determine the total chromium concentration from hard and decorative chromium electroplating tanks and chromium anodizing tanks.

Public Notices Belong In Newspapers,
Where People Will See Them.



Public Noticing and Regulatory Requirements Met

Section 6 Public Notifications



- Public hearing notices appeared in
 - The Delaware State News and Sunday News Journal
 - Delaware Register of Regulations
 - State Calendar of Public Meetings
 - The DNREC Public Notices Website
 - E-News Updates from Delaware's Office of Env. Protection
 - DAQ's Section 6 regulatory web page
- Verbal and email communications during development of draft and proposed amendment



Other information addressed in Exhibits

- The Public Hearing handouts
- A listing of existing facilities
- The Department's determination that affected sources do not qualify for additional consideration for less stringent requirements as provided under the Regulatory Flexibility Act
- The South Coast Air Quality Management District Method 205.1



Other information addressed in Exhibits

- Revision and enhancement to the previously developed compliance assistance tool reflecting the newly approved alternative test method
- The Section 6 Regulatory web page



For the latest information,
follow the ongoing development on
Section 6 Regulatory Web Page

<http://www.dnrec.delaware.gov/Air/Pages/Section6RTR.aspx>



ACRONYMS

7 DE Admin. Code	Title 7 of the Delaware Administrative Code
CFR	Code of Federal Regulations
DNREC	Delaware Department of Natural Resources and Environmental Control
Env.	Environmental
EPA	U. S. Environmental Protection Agency
MACT	Maximum Achievable Control Technology
RTR	Risk and Technology Review
Sub N	40 CFR Part 63 Subpart N

SAN 2015-01 Exhibits Listing

(2015 Amendment to Section 6 of 7 **DE Admin. Code** 1138)

DNREC

Exhibit #

1. Listing of the Department's Exhibits that will be presented at the August 4 public hearing.
2. Department's Public Hearing handouts distributed at the August 4, 2015 public hearing on the proposed amendment to Section 6 of 7 **DE Admin. Code** 1138.
3. EPA's proposed rulemaking that amongst other changes would amend the chromium electroplating and chromium anodizing standard (40 CFR Part 63 Subpart N) by adding another optional pre-approved test method (the South Coast Air Quality Management District "Test Method 205.1") under §63.344(c)(5) that appeared in the January 9, 2012 Federal Register (77 FR 1130).
4. EPA's final rulemaking that amongst other changes amended the chromium electroplating and chromium anodizing standard (40 CFR Part 63 Subpart N) by including the South Coast Air Quality Management District "Test Method 205.1" as an optional pre-approved test method under §63.344(c)(5) that appeared in the February 27, 2014 Federal Register (79 FR 11228).
5. The South Coast Air Quality Management District "Test Method 205.1" that was approved for use to demonstrate compliance on February 27, 2015. This test method was provided to known affected sources in emails (see Exhibits #8 and #9 below).
6. The Department's Start Action Notice 2015-01 approving the planned revision of Section 6 to 7 **DE Admin. Code** 1138.
7. The listing of the two existing Delaware sources that are subject to the requirements of Section 6 and thus potentially subject to the proposed amendment.
8. The May 11, 2015 email to Brian and Linda Taggart of Standard Technologies confirming our earlier conversation on the Department's plan to revise Section 6. The email also provided
 - The draft amendment to Section 6 [Exhibit #10],
 - The South Coast Air Quality Management District "Test Method 205.1" [Exhibit #5],
 - The final EPA rule [Exhibit #4] and
 - The draft notice for the August 4 public hearing [Exhibit #11].
9. The May 13, 2015 email to Rita Procino of Procino Plating confirming our earlier conversation on the Department's plan to revise Section 6. The email also provided
 - The draft amendment to Section 6 [Exhibit #10],
 - The South Coast Air Quality Management District "Test Method 205.1" [Exhibit #5],
 - The final EPA rule [Exhibit #4] and
 - The draft notice for the August 4 public hearing [Exhibit #11].
10. A copy of the May 7 draft amendment to Section 6 that was attached to the May 11 and 13, 2015 emails sent to known affected sources in Exhibits #8 and #9 above.
11. A copy of the draft Register Notice that provided current information regarding the planned August 4 public hearing that was attached to the May 11 and 13, 2015 emails sent to known affected sources in Exhibits #8 and #9 above.
12. The Regulatory Flexibility Act Analysis for the proposed amendment to Section 6 to 7 **DE Admin. Code** 1138.
13. The June 23, 2015 email to Brian and Linda Taggart of Standard Technologies providing them with updated information on the proposed regulatory language and advanced notice of the June 25 publication of the public hearing legal notice in the newspapers and the July 1 publication of the proposed regulatory language and register notice in the Delaware Register of Regulations.
14. The June 23, 2015 email to Rita and Mike Procino of Procino Plating providing them with updated information on the proposed regulatory language and advanced notice of the June 25 publication of the public hearing legal notice in the newspapers and the July 1 publication of the proposed regulatory language and register notice in the Delaware Register of Regulations.
15. The Statewide Calendar of Meetings notice, as posted on June 24, announcing the August 4, 2015 public hearings in Dover for the planned revision of Section 6 to 7 **DE Admin. Code** 1138, as well as, the planned revision to 7 **DE Admin. Code** 1141.
16. The DNREC Public Notice, as posted on June 28, announcing the August 4, 2015 public hearings in Dover for the planned revision of Sections 6 to 7 **DE Admin. Code** 1138, as well as, the planned revisions to 7 **DE Admin. Code** 1141.

17. The affidavit and copy of the public hearing notice as it appeared in the June 28, 2015 Delaware State News.
18. The affidavit and copy of the public hearing notice as it appeared in the June 28, 2015 Sunday News Journal.
19. The June 30, 2015 E-News Update from DELAWARE'S OFFICE OF ENVIRONMENTAL PROTECTION announcing the August 4, 2015 public hearings in Dover for the planned revision of Section 6 to 7 **DE Admin. Code 1138**, as well as, the planned revision to 7 **DE Admin. Code 1141**.
20. The Register Notice and the proposed revisions of Section 6 to 7 **DE Admin. Code 1138** as they appeared, beginning on page 23, in the July 1, 2015 Delaware Register of Regulations.
21. The PUBLIC NOTICE announcing the August 4, 2015 public hearing in Dover for the planned revisions of Section 6 to 7 **DE Admin. Code 1138**, as it appeared, beginning on page 80, in the July 1, 2015 Delaware Register of Regulations.
22. The revised and enhanced compliance assistance tool, which will assist affected facilities in complying with the requirement to notify the Department of upcoming performance testing to demonstrate initial compliance.
23. A copy of the Division of Air Quality web page, as it appeared on July 20, 2015, that was available for the public to access information on the Department's planned amendment of Section 6 since May 21, 2015 and for the public to follow changes and additions during the regulatory development process.
24. The Department's planned August 4, 2015 public hearing presentation w/associated power point slide.

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DIVISION OF AIR QUALITY

Air Quality Management Section

1138 Emission Standards for Hazardous Air Pollutants for Source Categories

~~9/11/13~~ 10/11/15**6.0 Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks****6.1 Applicability and designation of sources.**

- 6.1.1 The affected source to which the provisions of 6.0 of this regulation apply is each chromium electroplating or chromium anodizing tank at facilities performing hard chromium electroplating, decorative chromium electroplating, or chromium anodizing.
- 6.1.2 Owners or operators of affected sources subject to the provisions of 6.0 of this regulation shall also comply with the requirements of 3.0 of this regulation, according to the applicability of 3.0 to such sources, as identified in Table 6-3 of this regulation.
- 6.1.3 Process tanks associated with a chromium electroplating or chromium anodizing process, but in which neither chromium electroplating nor chromium anodizing is taking place, are not subject to the provisions of 6.0 of this regulation. Examples of such tanks include, but are not limited to, rinse tanks, etching tanks, and cleaning tanks. Likewise, tanks that contain a chromium solution, but in which no electrolytic process occurs, are not subject to 6.0. An example of such a tank is a chrome conversion coating tank where no electrical current is applied.
- 6.1.4 Affected sources in which research or laboratory operations are performed are exempt from the provisions of 6.0 of this regulation when such operations are taking place.
- 6.1.5 The owner or operator of an area source subject to 6.0 of this regulation is exempt from the obligation to obtain a Title V operating permit under 7 DE Admin. Code 1130 of the State of Delaware "Regulations Governing the Control of Air Pollution", if the owner or operator is not required to obtain a Title V operating permit under 3.1 of 7 DE Admin. Code 1130 for a reason other than the owner or operator's status as an area source under 6.0. Notwithstanding the previous sentence, the owner or operator shall continue to comply with the provisions of 6.0 applicable to area sources.

6.2 Definitions and nomenclature.**6.2.1 Definitions.**

Terms used in 6.0 of this regulation are defined in the Act, in 3.2 of this regulation, or in 6.2 of this regulation. For the purposes of 6.0, if the same term is defined in 6.2 and in 3.2, it shall have the meaning given in 6.2.

"Add-on air pollution control device" means equipment installed in the ventilation system of chromium electroplating and anodizing tanks for the purposes of collecting and containing chromium emissions from the tank or tanks.

"Affirmative defense" means, in the context of an enforcement proceeding, a response or a defense put forward by a defendant, regarding which the defendant has the burden of proof, and the merits of which are independently and objectively evaluated in a judicial or administrative proceeding.

"Air pollution control technique" means any method, such as an add-on air pollution control device or a chemical fume suppressant, used to reduce chromium emissions from chromium electroplating and chromium anodizing tanks.

"Base metal" means the metal or metal alloy that comprises the part.

"Bath component" means the trade or brand name of each component in trivalent chromium plating baths. For trivalent chromium baths, the bath composition is proprietary in most cases. Therefore, the trade or brand name for each component can be used; however, the chemical name of the wetting agent contained in that component shall be identified.

"Chemical fume suppressant" means any chemical agent that reduces or suppresses fumes or mists at the surface of an electroplating or anodizing bath; another term for fume suppressant is mist suppressant.

"Chromic acid" means the common name for chromium anhydride (CrO₃).

"Chromium anodizing" means the electrolytic process by which an oxide layer is produced on the surface of a base metal for functional purposes (e.g., corrosion resistance or electrical insulation) using 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, with a concentration typically ranging from 50 to 100 grams per liter (g/l), serves as the electrolyte.

"Chromium anodizing tank" means the receptacle or container along with the following accompanying internal and external components needed for chromium anodizing: rectifiers fitted with controls to allow for voltage adjustments, heat exchanger equipment, circulation pumps, and air agitation systems.

"Chromium electroplating tank" means the receptacle or container along with the following internal and external components needed for chromium electroplating: rectifiers, anodes, heat exchanger equipment, circulation pumps, and air agitation systems.

"Composite mesh-pad system" means an add-on air pollution control device typically consisting of several mesh-pad stages. The purpose of the first stage is to remove large particles. Smaller particles are removed in the second stage, which consists of the composite mesh pad. A final stage may remove any re-entrained particles not collected by the composite mesh pad.

"Contains hexavalent chromium" means, the substance consists of, or contains 0.1% or greater by weight, chromium trioxide, chromium (VI) oxide, chromic acid, or chromic anhydride.

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“Decorative chromium electroplating” means 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. In this process, the part or parts serve as the cathode in the electrolytic cell and the solution serves as the electrolyte. Typical current density applied during this process ranges from 540 to 2,400 amperes per square meter (amp/m²) for total plating times ranging between 0.5 to five minutes.

“Electroplating or anodizing bath” means the electrolytic solution used as 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 part or for oxidizing the base material.

“Emission limitation” means, for the purposes of 6.0 of this regulation, the concentration of total chromium allowed to be emitted expressed in milligrams per dry standard cubic meter (mg/dscm), or the allowable surface tension expressed in dynes per centimeter (dynes/cm).

“Enclosed hard chromium electroplating tank” means a chromium electroplating tank that is equipped with an enclosing hood and ventilated at half the rate or less that of an open surface tank of the same surface area.

“Existing affected source” means an affected hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank, the construction or reconstruction of which commenced on or before February 8, 2012.

“Facility” means the major or area source at which chromium electroplating or chromium anodizing is performed.

“Fiber-bed mist eliminator” means an add-on air pollution control device that removes contaminants from a gas stream through the mechanisms of inertial impaction and Brownian diffusion. These devices are typically installed downstream of another control device, which serves to prevent plugging, and consist of one or more fiber beds. Each bed consists of a hollow cylinder formed from two concentric screens; the fiber between the screens may be fabricated from glass, ceramic, plastic, or metal.

“Foam blanket” means 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.

“Fresh water” means water, such as tap water, that has not been previously used in a process operation or, if the water has been recycled from a process operation, it has been treated and meets the effluent guidelines for chromium wastewater.

“Hard chromium electroplating or industrial chromium electroplating” means a process by which a thick layer of chromium (typically 1.3 to 760 microns) is electrodeposited on a base material to provide a surface with functional properties such as wear resistance, a low coefficient of friction, hardness, and corrosion resistance. In this process, the part serves as the cathode in the electrolytic cell and the solution serves as the electrolyte. Hard chromium electroplating process is performed at current densities typically ranging from 1,600 to 6,500 amp/m² for total plating times ranging from 20 minutes to 36 hours depending upon the desired plate thickness.

“Hexavalent chromium” means the form of chromium in a valence state of +6.

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

“Maximum cumulative potential rectifier capacity” means the summation of the total installed rectifier capacity associated with the hard chromium electroplating tanks at a facility, expressed in amperes, multiplied by the maximum potential operating schedule of 8,400 hours per year and 0.7, which assumes that electrodes are energized 70% of the total operating time. The maximum potential operating schedule is based on operating 24 hours per day, seven days per week, 50 weeks per year.

“New affected source” means an affected hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank, the construction or reconstruction of which commenced after February 8, 2012.

“Open surface hard chromium electroplating tank” means a chromium electroplating tank that is ventilated at a rate consistent with good ventilation practices for open tanks.

“Operating parameter value” means a minimum or maximum value established for a control device or process parameter which, 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.

“Packed-bed scrubber” means an add-on air pollution control device consisting of a single or double packed bed that contains packing media on which the chromic acid droplets impinge. The packed-bed section of the scrubber is followed by a mist eliminator to remove any water entrained from the packed-bed section.

“Perfluorooctane sulfonic acid (PFOS)-based fume suppressant” means a fume suppressant that contains 1% or greater PFOS by weight.

“Research or laboratory operation” means an operation whose primary purpose is for research and development of new processes and products, that is conducted under the close supervision of technically trained personnel, and that is not involved in the manufacture of products for commercial sale in commerce, except in a de minimis manner.

“Small, hard chromium electroplating facility” means a facility that performs hard chromium electroplating and has a maximum cumulative potential rectifier capacity less than 60 million amp-hr/yr.

“Stalagmometer” means an instrument used to measure the surface tension of a solution by determining the mass of a drop of liquid by weighing a known number of drops or by counting the number of drops obtained from a given volume of liquid.

“**Surface tension**” means the property, due to molecular forces, that exists in the surface film of all liquids and tends to prevent liquid from spreading.

“**Tank operation**” means the time in which current or voltage is being applied to a chromium electroplating tank or a chromium anodizing tank.

“**Tensiometer**” means an instrument used to measure the surface tension of a solution by determining the amount of force needed to pull a ring from the liquid surface. The amount of force is proportional to the surface tension.

“**Trivalent chromium**” means the form of chromium in a valence state of +3.

“**Trivalent chromium process**” means the process used for electrodeposition of a thin layer of chromium onto a base material using a trivalent chromium solution instead of a chromic acid solution.

“**Wetting agent**” means the type of commercially available chemical fume suppressant that materially reduces the surface tension of a liquid.

6.2.2 Nomenclature.

The nomenclature used in 6.0 of this regulation has the following meaning:

6.2.2.1	AMR =	the allowable mass emission rate from each type of affected source subject to the same emission limitation in milligrams per hour (mg/hr).
6.2.2.2	AMR _{sys} =	the allowable mass emission rate from affected sources controlled by an add-on air pollution control device controlling emissions from multiple sources in mg/hr.
6.2.2.3	EL =	the applicable emission limitation in 6.3 of this regulation in milligrams per dry standard cubic meter (mg/dscm).
6.2.2.4	IA _{total} =	the sum of all inlet duct areas from both affected and nonaffected sources in meters squared.
6.2.2.5	IDA _i =	the total inlet area for all ducts associated with affected sources in meters squared.
6.2.2.6	IDA _{i,a} =	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 in meters squared.
6.2.2.7	VR =	the total of ventilation rates for each type of affected source subject to the same emission limitation in dry standard cubic meters per minute (dscm/min).
6.2.2.8	VR _{inlet} =	the total ventilation rate from all inlet ducts associated with affected sources in dscm/min.
6.2.2.9	VR _{inlet,a} =	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 in dscm/min.
6.2.2.10	VR _{tot} =	the average total ventilation rate for the three test runs as determined at the outlet by means of the Method 306 or 306A testing specified in Appendix A of 40 CFR Part 63 in dscm/min.

6.3 Standards.

6.3.1 Compliance with provisions.

- 6.3.1.1 Each owner or operator of an affected source subject to the provisions of 6.0 of this regulation shall comply with the requirements of 6.0 on and after the compliance dates specified in 6.4.1 of this regulation.
- 6.3.1.2 At all times, each owner or operator shall operate and maintain any affected source subject to the requirements of 6.0 of this regulation, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require the owner or operator to make any further efforts to reduce emissions if levels required by 6.0 have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

6.3.2 Applicability of emission limitations.

- 6.3.2.1 The emission limitations in 6.3 of this regulation apply during tank operation as defined in 6.2 of this regulation, and during periods of startup and shutdown as these are routine occurrences for affected sources subject to 6.0 of this regulation. The emission limitations in 6.3 also apply during periods of malfunction. In response to an action to enforce the standards set forth in 6.0, the owner or operator may assert a defense to a claim for civil penalties for violations of such standards that are caused by a malfunction, as defined in 3.2 of this regulation. Appropriate penalties may be assessed, however, if the owner or operator fails to meet the burden of proving all the requirements in the affirmative defense. The affirmative defense shall not be available for claims for injunctive relief.
- 6.3.2.1.1 To establish the affirmative defense in any action to enforce such a standard, the owner or operator shall timely meet the reporting requirements of 6.3.2.1.2 of this regulation, and shall prove by a preponderance of evidence that:
- 6.3.2.1.1.1 The violation was caused by a sudden, infrequent, and unavoidable failure of air pollution control equipment, process equipment, or a process to operate in a normal and usual manner; and could not have been prevented through careful planning, proper design, or better operation and maintenance procedures; and did not stem from any activity or event that could have been foreseen and avoided, or planned for; and was not part of a recurring pattern indicative of inadequate design, operation, or maintenance;

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- 6.3.2.1.1.2 Repairs were made as expeditiously as possible when exceeded violation occurred. Off-shift and overtime labor were used, to the extent practicable to make these repairs;
- 6.3.2.1.1.3 The frequency, amount, and duration of the violation (including any bypass) were minimized to the maximum extent practicable;
- 6.3.2.1.1.4 If the violation resulted from a bypass of control equipment or a process, then the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- 6.3.2.1.1.5 All possible steps were taken to minimize the impact of the violation on ambient air quality, the environment, and human health;
- 6.3.2.1.1.6 All emissions monitoring and control systems were kept in operation if at all possible, consistent with safety and good air pollution control practices;
- 6.3.2.1.1.7 All of the actions in response to the violation were documented by properly signed, contemporaneous operating logs;
- 6.3.2.1.1.8 At all times, the affected sources were operated in a manner consistent with good practices for minimizing emissions;
- 6.3.2.1.1.9 A written root cause analysis was prepared, the purpose of which is to determine, correct, and eliminate the primary causes of the malfunction and the excess emissions resulting from the malfunction event at issue. The analysis shall also specify, using the best monitoring methods and engineering judgment, the amount of excess emissions that were the result of the malfunction.

6.3.2.1.2 Affirmative defense report.

The owner or operator seeking to assert an affirmative defense shall submit a written report to the Department with all necessary supporting documentation, that it has met the requirements set forth in 6.3.2.1.1 of this regulation. This affirmative defense report shall be included in the first periodic compliance report, deviation report, or excess emission report otherwise required after the initial occurrence of the violation of 6.0 of this regulation (which may be the end of any applicable averaging period). If such compliance report, deviation report, or excess emission report is due less than 45 days after the initial occurrence of the violation, the affirmation defense report may be included in the second compliance report, deviation report, or excess emission report due after the initial occurrence of the violation of 6.0.

6.3.2.2 If an owner or operator is controlling a group of tanks with a common add-on air pollution control device, the emission limitations in 6.3.3 through 6.3.5 of this regulation apply whenever any one affected source is operated. The emission limitation that applies to the group of affected sources is as follows:

- 6.3.2.2.1 The emission limitation identified in 6.3.3 through 6.3.5 of this regulation if the affected sources are performing the same type of operation (e.g., hard chromium electroplating), are subject to the same emission limitation, and are not controlled by an add-on air pollution control device also controlling nonaffected sources;
- 6.3.2.2.2 The emission limitation calculated according to 6.5.5.3 of this regulation if affected sources are performing the same type of operation, are subject to the same emission limitation, and are controlled with an add-on air pollution control device that is also controlling nonaffected sources; and
- 6.3.2.2.3 The emission limitation calculated according to 6.5.5.4 of this regulation if affected sources are performing different types of operations or if affected sources are performing the same operations but subject to different emission limitations and are controlled with an add-on air pollution control device that may also be controlling emissions from nonaffected sources.

6.3.3 Standards for hard chromium electroplating tanks.

6.3.3.1 Standards for open surface hard chromium electroplating tanks.

During tank operation, each owner or operator of an existing, new, or reconstructed affected open surface hard chromium electroplating tank shall be in compliance with the applicable requirements of 6.3.3.1.1, 6.3.3.1.2, 6.3.3.1.3, and 6.3.3.1.4 of this regulation.

6.3.3.1.1 Prior to September 19, 2014, each owner or operator of an existing affected open surface hard chromium electroplating tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.3.1.1.1, 6.3.3.1.1.2, or 6.3.3.1.1.3 of this regulation.

- 6.3.3.1.1.1 Each owner or operator of an existing open surface hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.03 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (1.3×10^{-5} grains per dry standard cubic foot (gr/dscf)), if the existing open surface hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility;
- 6.3.3.1.1.2 Each owner or operator of an existing open surface hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.015 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (6.6×10^{-6} grains per dry standard cubic foot (gr/dscf)), if the existing open surface hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility; or

- 6.3.3.1.1.3 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.3.1.1 of this regulation, each owner or operator of an existing open surface hard chromium electroplating tank shall not allow the surface tension of the electroplating bath contained within the open surface hard chromium electroplating tank to exceed 45 dynes per centimeter (dynes/cm) (3.1×10^{-3} pound-force per foot (lb_f/ft)) as measured by a stalagmometer or 35 dynes/cm (2.4×10^{-3} lb_f/ft) as measured by a tensiometer at any time during tank operation.
- 6.3.3.1.2 On and after September 19, 2014, each owner or operator of an existing affected open surface hard chromium electroplating tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.3.1.2.1, 6.3.3.1.2.2, or 6.3.3.1.2.3 of this regulation.
- 6.3.3.1.2.1 Each owner or operator of an existing open surface hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.015 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (6.6×10^{-6} grains per dry standard cubic foot (gr/dscf)), if the existing open surface hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility;
- 6.3.3.1.2.2 Each owner or operator of an existing open surface hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.011 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (4.8×10^{-6} grains per dry standard cubic foot (gr/dscf)), if the existing open surface hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility; or
- 6.3.3.1.2.3 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.3.1.2 of this regulation, each owner or operator of an existing open surface hard chromium electroplating tank shall not allow the surface tension of the electroplating bath contained within the open surface hard chromium electroplating tank to exceed 40 dynes per centimeter (dynes/cm) (2.8×10^{-3} pound-force per foot (lb_f/ft)) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lb_f/ft) as measured by a tensiometer at any time during tank operation.
- 6.3.3.1.3 On and after September 11, 2013, each owner or operator of a new or reconstructed affected open surface hard chromium electroplating tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.3.1.3.1 or 6.3.3.1.3.2 of this regulation.
- 6.3.3.1.3.1 Each owner or operator of a new or reconstructed open surface hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.006 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (2.6×10^{-6} grains per dry standard cubic foot (gr/dscf)) or
- 6.3.3.1.3.2 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.3.1.3 of this regulation, each owner or operator of a new or reconstructed open surface hard chromium electroplating tank shall not allow the surface tension of the electroplating bath contained within the open surface hard chromium electroplating tank to exceed 40 dynes per centimeter (dynes/cm) (2.8×10^{-3} pound-force per foot (lb_f/ft)) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lb_f/ft) as measured by a tensiometer at any time during tank operation.
- 6.3.3.1.4 On and after September 19, 2015, each owner or operator of an existing, new, or reconstructed affected open surface hard chromium electroplating tank shall not add PFOS-based fume suppressants to any affected open surface hard chromium electroplating tank.
- 6.3.3.2 Standards for enclosed hard chromium electroplating tanks.
- During tank operation, each owner or operator of an existing, new, or reconstructed affected enclosed hard chromium electroplating tank shall be in compliance with the applicable requirements of 6.3.3.2.1, 6.3.3.2.2, 6.3.3.2.3, and 6.3.3.2.4 of this regulation.
- 6.3.3.2.1 Prior to September 19, 2014, each owner or operator of an existing affected enclosed hard chromium electroplating tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.3.2.1.1, 6.3.3.2.1.2, 6.3.3.2.1.3, 6.3.3.2.1.4, or 6.3.3.2.1.5 of this regulation.
- 6.3.3.2.1.1 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.03 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (1.3×10^{-5} grains per dry standard cubic foot (gr/dscf)), if the existing enclosed hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility;
- 6.3.3.2.1.2 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.015 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (6.6×10^{-6} grains per dry standard cubic foot (gr/dscf)), if the existing enclosed hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility;
- 6.3.3.2.1.3 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.3.2.1 of this regulation, each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the surface tension of the electroplating bath contained within the enclosed hard chromium electroplating tank to exceed 45 dynes per centimeter (dynes/cm) (3.1×10^{-3} pound-force per foot (lb_f/ft)) as measured by a stalagmometer or 35 dynes/cm (2.4×10^{-3} lb_f/ft) as measured by a tensiometer at any time during tank operation;
- 6.3.3.2.1.4 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the mass emission rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate

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determined by using the calculation procedure in 6.5.6.2 of this regulation, if the existing enclosed hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility; or

- 6.3.3.2.1.5 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the mass emission rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate determined by using the calculation procedure in 6.5.6.1 of this regulation, if the existing enclosed hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility.
- 6.3.3.2.2 On and after September 19, 2014, each owner or operator of an existing affected enclosed hard chromium electroplating tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.3.2.2.1, 6.3.3.2.2.2, 6.3.3.2.2.3, 6.3.3.2.2.4, or 6.3.3.2.2.5 of this regulation.
- 6.3.3.2.2.1 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.015 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (6.6×10^{-6} grains per dry standard cubic foot (gr/dscf)), if the existing enclosed hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility;
- 6.3.3.2.2.2 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.011 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (4.8×10^{-6} grains per dry standard cubic foot (gr/dscf)), if the existing enclosed hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility;
- 6.3.3.2.2.3 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.3.2.2 of this regulation, each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the surface tension of the electroplating bath contained within the enclosed hard chromium electroplating tank to exceed 40 dynes per centimeter (dynes/cm) (2.8×10^{-3} pound-force per foot (lb/ft)) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lb/ft) as measured by a tensiometer at any time during tank operation;
- 6.3.3.2.2.4 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the mass emission rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate determined by using the calculation procedure in 6.5.6.4 of this regulation, if the existing enclosed hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility; or
- 6.3.3.2.2.5 Each owner or operator of an existing enclosed hard chromium electroplating tank shall not allow the mass emission rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate determined by using the calculation procedure in 6.5.6.3 of this regulation, if the existing enclosed hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility.
- 6.3.3.2.3 On and after September 11, 2013, each owner or operator of a new or reconstructed affected enclosed hard chromium electroplating tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.3.2.3.1, 6.3.3.2.3.2, or 6.3.3.2.3.3 of this regulation.
- 6.3.3.2.3.1 Each owner or operator of a new or reconstructed enclosed hard chromium electroplating tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.006 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (2.6×10^{-6} grains per dry standard cubic foot (gr/dscf));
- 6.3.3.2.3.2 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.3.2.3 of this regulation, each owner or operator of a new or reconstructed enclosed hard chromium electroplating tank shall not allow the surface tension of the electroplating bath contained within the enclosed hard chromium electroplating tank to exceed 40 dynes per centimeter (dynes/cm) (2.8×10^{-3} pound-force per foot (lb/ft)) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lb/ft) as measured by a tensiometer at any time during tank operation; or
- 6.3.3.2.3.3 Each owner or operator of a new or reconstructed enclosed hard chromium electroplating tank shall not allow the mass emission rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate determined by using the calculation procedure in 6.5.6.5 of this regulation.
- 6.3.3.2.4 On and after September 19, 2015, each owner or operator of an existing, new, or reconstructed affected enclosed hard chromium electroplating tank shall not add PFOS-based fume suppressants to any affected enclosed hard chromium electroplating tank.
- 6.3.3.2.5 [Reserved]
- 6.3.3.3 Size demonstration of a hard chromium electroplating facility.
- 6.3.3.3.1 An owner or operator may demonstrate the size of a hard chromium electroplating facility through the definitions in 6.2.1 of this regulation. Alternatively, an owner or operator of a facility with a maximum cumulative potential rectifier capacity of 60 million amp-hr/yr or more may be considered small if the actual cumulative rectifier capacity is less than 60 million amp-hr/yr as demonstrated using the following procedures:

- 6.3.3.3.1.1 If records show that the facility's previous annual actual rectifier capacity was less than 60 million amp-hr/yr, by using nonresettable ampere-hr meters and keeping monthly records of actual ampere-hr usage for each 12-month rolling period following the compliance date in accordance with 6.7.2.12 of this regulation. The actual cumulative rectifier capacity for the previous 12-month rolling period shall be tabulated monthly by adding the capacity for the current month to the capacities for the previous 11 months or
- 6.3.3.3.1.2 By accepting a Federally-enforceable limit on the maximum cumulative potential rectifier capacity of a hard chromium electroplating facility and by maintaining monthly records in accordance with 6.7.2.12 of this regulation to demonstrate that the limit has not been exceeded. The actual cumulative rectifier capacity for the previous 12-month rolling period shall be tabulated monthly by adding the capacity for the current month to the capacities for the previous 11 months.
- 6.3.3.3.2 Once the monthly records required to be kept in 6.3.3.3.1 and 6.7.2.12 of this regulation show that the actual cumulative rectifier capacity over the previous 12-month rolling period corresponds to the large designation, the owner or operator is subject to the applicable emission limitation identified in 6.3.3.1.1.2, 6.3.3.1.2.2, 6.3.3.2.1.2, 6.3.3.2.1.5, 6.3.3.2.2.2, and 6.3.3.2.2.5 of this regulation, in accordance with the compliance schedule in 6.4.1.5 of this regulation.
- 6.3.4 Standards for decorative chromium electroplating tanks using a chromic acid bath and chromium anodizing tanks.
- During tank operation, each owner or operator of an existing, new, or reconstructed affected decorative chromium electroplating tank using a chromic acid bath or affected chromium anodizing tank shall be in compliance with the applicable requirements of 6.3.4.1, 6.3.4.2, 6.3.4.3, and 6.3.4.4 of this regulation.
- 6.3.4.1 Prior to September 19, 2014, each owner or operator of an existing affected decorative chromium electroplating tank using a chromic acid bath or an existing affected chromium anodizing tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.4.1.1 or 6.3.4.1.2 of this regulation.
- 6.3.4.1.1 Each owner or operator of an existing decorative chromium electroplating tank using a chromic acid bath or an existing chromium anodizing tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.01 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (4.4×10^{-6} grains per dry standard cubic foot (gr/dscf)) or
- 6.3.4.1.2 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.4.1 of this regulation, each owner or operator of an existing decorative chromium electroplating tank using a chromic acid bath or an existing chromium anodizing tank shall not allow the surface tension of the electroplating bath contained within the decorative chromium electroplating tank using a chromic acid bath or the chromium anodizing tank to exceed 45 dynes per centimeter (dynes/cm) (3.1×10^{-3} pound-force per foot (lb_f/ft)) as measured by a stalagmometer or 35 dynes/cm (2.4×10^{-3} lb_f/ft) as measured by a tensiometer at any time during tank operation.
- 6.3.4.2 On and after September 19, 2014, each owner or operator of an existing affected decorative chromium electroplating tank using a chromic acid bath or an existing affected chromium anodizing tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.4.2.1 or 6.3.4.2.2 of this regulation.
- 6.3.4.2.1 Each owner or operator of an existing decorative chromium electroplating tank using a chromic acid bath or an existing chromium anodizing tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.007 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (3.1×10^{-6} grains per dry standard cubic foot (gr/dscf)) or
- 6.3.4.2.2 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.4.2 of this regulation, each owner or operator of an existing decorative chromium electroplating tank using a chromic acid bath or an existing chromium anodizing tank shall not allow the surface tension of the electroplating bath contained within the decorative chromium electroplating tank using a chromic acid bath or the chromium anodizing tank to exceed 40 dynes per centimeter (dynes/cm) (2.8×10^{-3} pound-force per foot (lb_f/ft)) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lb_f/ft) as measured by a tensiometer at any time during tank operation.
- 6.3.4.3 On and after September 11, 2013, each owner or operator of a new or reconstructed affected decorative chromium electroplating tank using a chromic acid bath or a new or reconstructed chromium anodizing tank shall control chromium emissions discharged to the atmosphere from that affected source by being in compliance with 6.3.4.3.1 or 6.3.4.3.2 of this regulation.
- 6.3.4.3.1 Each owner or operator of a new or reconstructed decorative chromium electroplating tank using a chromic acid bath or a new or reconstructed chromium anodizing tank shall not allow the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.006 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air (2.6×10^{-6} grains per dry standard cubic foot (gr/dscf)) or
- 6.3.4.3.2 If a chemical fume suppressant containing a wetting agent is used to comply with 6.3.4.3 of this regulation, each owner or operator of a new or reconstructed decorative chromium electroplating tank using a chromic acid bath or a new or reconstructed chromium anodizing tank shall not allow the surface tension of the electroplating bath contained within the decorative chromium electroplating tank using a chromic acid bath or the chromium anodizing tank to exceed 40 dynes per centimeter (dynes/cm) (2.8×10^{-3} pound-force per foot (lb_f/ft)) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lb_f/ft) as measured by a tensiometer at any time during tank operation.
- 6.3.4.4 On and after September 19, 2015, each owner or operator of an existing, new, or reconstructed affected decorative chromium electroplating tank using a chromic acid bath or an existing, new, or reconstructed chromium anodizing tank shall not add PFOS-based fume suppressants to any affected decorative chromium electroplating tank using a chromic acid bath or any affected chromium anodizing tank.
- 6.3.5 Standards for decorative chromium electroplating tanks using a trivalent chromium bath.

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- 6.3.5.1 Each owner or operator of an existing, new, or reconstructed decorative chromium electroplating tank that uses a trivalent chromium bath that incorporates a wetting agent as a bath ingredient is subject to the recordkeeping and reporting requirements in 6.7.2.14 and 6.8.9 of this regulation, but are not subject to the operation and maintenance procedure requirements in 6.3.6 of this regulation, or the continuous compliance monitoring requirements in 6.4.3 of this regulation. The wetting agent shall be an ingredient in the trivalent chromium bath components purchased as a package.
- 6.3.5.2 Each owner or operator of an existing, new, or reconstructed decorative chromium electroplating tank that uses a trivalent chromium bath that does not incorporate a wetting agent as a bath ingredient is subject to the standards in 6.3.4 of this regulation.
- 6.3.5.3 Each owner or operator of an existing, new, or reconstructed decorative chromium electroplating tank that had been using a trivalent chromium bath that incorporates a wetting agent and ceases using this type of bath shall fulfill the reporting requirements in 6.8.9.3 of this regulation and comply with the applicable emission limitation within the timeframe specified in 6.4.1.7 of this regulation.
- 6.3.5.4 On and after September 19, 2015, each owner or operator of an existing, new, or reconstructed affected decorative chromium electroplating tank that uses a trivalent chromium bath shall not add PFOS-based fume suppressants to any affected decorative chromium electroplating tank that uses a trivalent chromium bath.

6.3.6 Operation and maintenance procedures.

All owners or operators subject to the standards in 6.3.3 and 6.3.4 of this regulation are subject to these operation and maintenance procedures.

6.3.6.1 Requirements. The owner or operator of an existing, new, or reconstructed affected source shall:

- 6.3.6.1.1 At all times, including periods of startup, shutdown, and malfunction, each owner or operator shall operate and maintain any affected source, including associated air pollution control devices and monitoring equipment, in a manner consistent with good air pollution control practices and consistent with the operation and maintenance plan required in 6.3.6.3 of this regulation.
- 6.3.6.1.2 Each owner or operator shall correct malfunctions as soon as practicable after their occurrence in accordance with the operation and maintenance plan required in 6.3.6.3 of this regulation.
- 6.3.6.1.3 The operation and maintenance requirements established in 6.3.6 of this regulation are enforceable independent of emissions limitations or other requirements in 6.0 of this regulation.

6.3.6.2 Review and revision of operating and maintenance procedures.

- 6.3.6.2.1 Determination of whether acceptable operation and maintenance procedures are being used will be based on information available to the Department, which may include, but is not limited to, monitoring results; review of the operation and maintenance plan, procedures, and records; and inspection of the source.
- 6.3.6.2.2 Based on the results of a determination made under 6.3.6.2.1 of this regulation, the Department may require that an owner or operator of an affected source make changes to the operation and maintenance plan required in 6.3.6.3 of this regulation for that source. Revisions may be required if the Department finds that the plan:
 - 6.3.6.2.2.1 Does not address a malfunction that has occurred;
 - 6.3.6.2.2.2 Fails to provide for the proper operation of the process equipment, the air pollution control techniques, or the monitoring equipment during a malfunction in a manner consistent with good air pollution control practices; or
 - 6.3.6.2.2.3 Does not provide adequate procedures for correcting malfunctioning process equipment, air pollution control techniques, or monitoring equipment as quickly as practicable.

6.3.6.3 Operation and maintenance plan.

- 6.3.6.3.1 The owner or operator of an affected source subject to the operation and maintenance procedures in 6.3.6 of this regulation shall prepare an operation and maintenance plan to be implemented no later than the applicable compliance date. The plan shall be incorporated by reference into the source's Title V operating permit, if and when a Title V operating permit is required. The plan shall include the following elements:
 - 6.3.6.3.1.1 The plan shall specify the operation and maintenance criteria for the affected source, the add-on air pollution control device (if such a device is used to comply with the emission limitations), and the process and control system monitoring equipment, and shall include a standardized checklist to document the operation and maintenance of this equipment;
 - 6.3.6.3.1.2 For sources using an add-on air pollution control device or monitoring equipment to comply with 6.0 of this regulation, the plan shall incorporate the operation and maintenance procedures for that device or monitoring equipment, as identified in Table 6-1 of this regulation, if the specific equipment used is identified in Table 6-1;
 - 6.3.6.3.1.3 If the specific equipment used is not identified in Table 6-1 of this regulation, the plan shall incorporate proposed operation and maintenance procedures. These proposed operation and maintenance procedures shall be submitted to the Administrator (with copy to the Department) for approval as part of the submittal required in 6.4.4 of this regulation;
 - 6.3.6.3.1.4 The plan shall specify procedures to be followed to ensure that equipment or process malfunctions due to poor maintenance or other preventable conditions do not occur; and

- 6.3.6.3.1.5 The plan shall include a systematic procedure for identifying 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.
- 6.3.6.3.1.6 The plan shall include housekeeping procedures, as specified in Table 6-2 of this regulation.
- 6.3.6.3.2 If the operation and maintenance plan fails to address or inadequately addresses an event that meets the characteristics of a malfunction at the time the plan is initially developed, the owner or operator shall revise the operation and maintenance plan within 45 days after such an event occurs. The revised plan shall include procedures for operating and maintaining the process equipment, add-on air pollution control device, or monitoring equipment during similar malfunction events, and a program for corrective action for such events.
- 6.3.6.3.3 Recordkeeping associated with the operation and maintenance plan is identified in 6.3.6.3.5 and 6.7.2 of this regulation. Reporting associated with the operation and maintenance plan is identified in 6.3.6.3.4, 6.8.7, and 6.8.8 of this regulation.
- 6.3.6.3.4 If actions taken by the owner or operator during periods of malfunction are inconsistent with the procedures specified in the operation and maintenance plan required in 6.3.6.3.1 of this regulation, the owner or operator shall record the actions taken for that event and shall report by phone such actions within two working days after commencing actions inconsistent with the plan. This report shall be followed by a letter within seven working days after the end of the event, unless the owner or operator makes alternative reporting arrangements, in advance, with the Department.
- 6.3.6.3.5 The owner or operator shall keep the written operation and maintenance plan on record after it is developed to be made available for inspection, upon request, by the Department for the life of the affected source or until the source is no longer subject to the provisions of 6.0 of this regulation. In addition, if the operation and maintenance plan is revised, the owner or operator shall keep previous (i.e., superseded) versions of the operation and maintenance plan on record to be made available for inspection, upon request, by the Department for a period of five years after each revision to the plan.
- 6.3.6.3.6 To satisfy the requirements in 6.3.6.3 of this regulation, the owner or operator may use applicable standard operating procedure (SOP) manuals, Occupational Safety and Health Administration (OSHA) plans, or other existing plans, provided the alternative plans meet the requirements in 6.3 of this regulation.
- 6.3.7 The standards in 6.3 of this regulation that apply to chromic acid baths shall not be met by using a reducing agent to change the form of chromium from hexavalent to trivalent.

Table 6-1 -- Summary of Operation and Maintenance Procedures

Control technique	Operation and maintenance procedures	Frequency
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.	1. Once per quarter.
	2. Visually inspect back portion of the mesh pad closest to the fan to ensure there is no breakthrough of chromic acid mist.	2. Once per quarter.
	3. Visually inspect ductwork from tank to the control device to ensure there are no leaks.	3. Once per quarter.
	4. Perform washdown of the composite mesh-pads in accordance with manufacturer's recommendations.	4. Per manufacturer.
Packed-bed scrubber (PBS).	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.	1. Once per quarter.
	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.	2. Once per quarter.
	3. Same as number 3 for CMP system.	3. Once per quarter.
	4. Add fresh makeup water to the top of the packed bed ^{a,b} .	4. Whenever makeup is added.
PBS/CMP system.	1. Same as number 1 for CMP system.	1. Once per quarter.
	2. Same as number 2 for CMP system.	2. Once per quarter.
	3. Same as number 3 for CMP system.	3. Once per quarter.
	4. Same as number 4 for CMP system.	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.	1. Once per quarter.
	2. Visually inspect ductwork from tank or tanks to the control device to ensure there are no leaks.	2. Once per quarter.
	3. Perform washdown of fiber elements in accordance with manufacturer's recommendations.	3. Per manufacturer.
Air pollution control device (APCD) not listed in rule.	To be proposed by the source for approval by the Administrator.	To be proposed by the source for approval by the Administrator.
Monitoring Equipment		
Pitot tube.	Backflush with water, or remove from the duct and rinse with fresh water. Replace in the duct and rotate 180 degrees to ensure that the same zero reading is obtained. Check pitot tube ends for damage. Replace pitot tube if cracked or fatigued.	Once per quarter.
Stalagmometer.	Follow manufacturer's recommendations.	

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

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- ^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 Operating and maintenance procedures for the control device installed upstream of the fiber-bed mist eliminator to prevent plugging do not apply as long as the operating and maintenance procedures for the fiber-bed unit are followed.

Table 6-2 -- Housekeeping Procedures

For	The owner or operator shall:	At this minimum frequency
<p>1. Any substance used in an affected chromium electroplating or chromium anodizing tank that contains hexavalent chromium.</p>	<p>(a) Store the substance in a closed container in an enclosed storage area or building AND</p> <p>(b) Use a closed container when transporting the substance from the enclosed storage area.</p>	<p>At all times, except when transferring the substance to and from the container.</p> <p>Whenever transporting substance, except when transferring the substance to and from the container.</p>
<p>2. Each affected tank, to minimize spills of bath solution that result from dragout.</p> <p>Note: This measure does not require the return of contaminated bath solution to the tank. This requirement applies only as the parts are removed from the tank. Once away from the tank area, any spilled solution shall be handled in accordance with Item 4 of these housekeeping procedures.</p>	<p>(a) Install drip trays that collect and return to the tank any bath solution that drips or drains from parts as the parts are removed from the tank OR</p> <p>(b) Contain and return to the tank any bath solution that drains or drips from parts as the parts are removed from the tank OR</p> <p>(c) Collect and treat in an onsite wastewater treatment plant any bath solution that drains or drips from parts as the parts are removed from the tank.</p>	<p>Prior to operating the tank.</p> <p>Whenever removing parts from an affected tank.</p> <p>Whenever removing parts from an affected tank.</p>
<p>3. Each spraying operation for removing excess chromic acid from parts removed from, and occurring over, an affected tank.</p>	<p>Install a splash guard to minimize overspray during spraying operations and to ensure that any hexavalent chromium laden liquid captured by the splash guard is returned to the affected chromium electroplating or anodizing tank.</p>	<p>Prior to any such spraying operation.</p>

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4. Each operation that involves the handling or use of any substance used in an affected chromium electroplating or chromium anodizing tank that contains hexavalent chromium.	Begin clean up, or otherwise contain, all spills of the substance. Note: Substances that fall or flow into drip trays, pans, sumps, or other containment areas are not considered spills.	Within 1 hour of the spill.
5. Surfaces within the enclosed storage area, open floor area, walkways around affected tanks contaminated with hexavalent chromium from an affected chromium electroplating or chromium anodizing tank.	(a) Clean the surfaces using one or more of the following methods: (i) HEPA vacuuming; (ii) Hand-wiping with a damp cloth; (iii) Wet mopping; (iv) Hose down or rinse with potable water that is collected in a wastewater collection system; (v) Other cleaning method approved by the Department; OR (b) Apply a non-toxic chemical dust suppressant to the surfaces.	At least once every 7 days if one or more chromium electroplating or chromium anodizing tanks were used, or at least after every 40 hours of operating time of one or more affected chromium electroplating or chromium anodizing tank, whichever is later. According to manufacturer's recommendations.
6. All buffing, grinding, or polishing operations that are located in the same room as chromium electroplating or chromium anodizing tank.	Separate the buffing, grinding, or polishing operations from any affected electroplating or anodizing operation tank by installing a physical barrier; the barrier may take the form of plastic strip curtains.	Prior to beginning the buffing, grinding, or polishing operation.
7. All chromium or chromium-containing wastes generated from housekeeping procedures.	Store, dispose, recover, or recycle the wastes using practices that do not lead to fugitive dust and in accordance with hazardous waste requirements.	At all times.

6.4 Compliance provisions.

6.4.1 Compliance dates.

6.4.1.1 The owner or operator of an existing affected source shall be in compliance with the applicable provisions of 6.0 of this regulation, except for the emission limitations in 6.3.3, 6.3.4, and 6.3.5 of this regulation, by no later than September 11, 2013 and shall be in compliance with the emission limitations specified in 6.4.1.1.1 and 6.4.1.1.2 of this regulation by no later than September 11, 2013.

6.4.1.1.1 Prior to September 19, 2014, the owner or operator of an existing affected source shall be in compliance with the applicable emission limitations in 6.3.3.1.1, 6.3.3.2.1, 6.3.3.3, 6.3.4.1, and 6.3.5.1 through 6.3.5.3 of this regulation.

6.4.1.1.2 On and after September 19, 2014, the owner or operator of an existing affected source shall be in compliance with the applicable emission limitations in 6.3.3.1.2, 6.3.3.2.2, 6.3.3.3, 6.3.4.2, and 6.3.5.1 through 6.3.5.3 of this regulation.

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- 6.4.1.2 The owner or operator of a new or reconstructed affected source shall be in compliance with the applicable provisions of 6.0 of this regulation by no later than September 11, 2013 or immediately upon startup of the source, whichever is later.
- 6.4.1.3 The owner or operator of an existing area source that increases actual or potential emissions of hazardous air pollutants such that the area source becomes a major source shall comply with the provisions for existing major sources, including the reporting provisions in 6.8.7 of this regulation, immediately upon becoming a major source.
- 6.4.1.4 The owner or operator of a new area source (i.e., an area source for which construction or reconstruction was commenced after February 8, 2012) that increases actual or potential emissions of hazardous air pollutants such that the area source becomes a major source shall comply with the provisions for new major sources, including the reporting provisions in 6.8.7 of this regulation, immediately upon becoming a major source.
- 6.4.1.5 An owner or operator of an existing hard chromium electroplating tank or tanks located at a small, hard chromium electroplating facility that increases its maximum cumulative potential rectifier capacity, or its actual cumulative rectifier capacity, such that the facility becomes a large, hard chromium electroplating facility shall comply with the appropriate emission limitation identified in 6.3.3.1.1.2, 6.3.3.1.2.2, 6.3.3.2.1.2, 6.3.3.2.1.5, 6.3.3.2.2.2, and 6.3.3.2.2.5 of this regulation no later than one year after the month in which monthly records required by 6.3.3.3.1 and 6.7.2.12 of this regulation show that the large designation is met.
- 6.4.1.6 Request for an extension of compliance. An owner or operator of an affected source or sources that requests an extension of compliance shall do so in accordance with the applicable provisions of 3.6.9 of this regulation. When the owner or operator is requesting the extension for more than one affected source located at the facility, then only one request may be submitted for all affected sources at the facility.
 - 6.4.1.6.1 The owner or operator of an existing affected source who is unable to comply with a relevant standard under 6.0 of this regulation may request that the Department grant an extension allowing the owner or operator up to one additional year to comply with the standard for the affected source. The owner or operator of an affected source who has requested an extension of compliance under 6.4.1.6 of this regulation and is otherwise required to obtain a Title V permit for the source shall apply for such permit or apply to have the Title V permit revised to incorporate the conditions of the extension of compliance. The conditions of an extension of compliance granted under 6.4.1.6 will be incorporated into the owner or operator's Title V permit for the affected source or sources according to the provisions of 7 DE Admin. Code 1130.
 - 6.4.1.6.2 Any request for an extension of compliance under 6.4.1.6 of this regulation shall be submitted in writing to the Department not later than 6 months before the affected source's compliance date as specified in 6.4.1 of this regulation.
- 6.4.1.7 An owner or operator of a decorative chromium electroplating tank that uses a trivalent chromium bath that incorporates a wetting agent, and that ceases using the trivalent chromium process, shall comply with the emission limitation now applicable to the tank within one year of switching bath operation.
- 6.4.1.8 No later than September 11, 2013, the owner or operator of an affected source that is subject to the standards in 6.3.3 or 6.3.4 of this regulation shall implement the housekeeping procedures specified in Table 6-2 of this regulation.
- 6.4.2 Methods to demonstrate initial compliance.
 - 6.4.2.1 Except as provided in 6.4.2.2 and 6.4.2.3 of this regulation, an owner or operator of an affected source subject to the requirements of 6.0 of this regulation is required to conduct an initial performance test as required under 3.7 of this regulation using the procedures and test methods listed in 6.5 and 3.7 of this regulation.
 - 6.4.2.2 If the owner or operator of an affected source meets all of the following criteria, an initial performance test is not required to be conducted under 6.0 of this regulation:
 - 6.4.2.2.1 The affected source is a hard chromium electroplating tank, a decorative chromium electroplating tank or a chromium anodizing tank;
 - 6.4.2.2.2 A wetting agent is used in the plating or anodizing bath to inhibit chromium emissions from the affected source; and
 - 6.4.2.2.3 The owner or operator complies with the applicable surface tension limit in 6.3.3.1.1.3, 6.3.3.1.2.3, 6.3.3.1.3.2, 6.3.3.2.1.3, 6.3.3.2.2.3, 6.3.3.2.3.2, 6.3.4.1.2, 6.3.4.2.2, or 6.3.4.3.2 of this regulation as demonstrated through the continuous compliance monitoring required in 6.4.3.5.2 of this regulation.
 - 6.4.2.3 If the affected source is a decorative chromium electroplating tank using a trivalent chromium bath, and the owner or operator is subject to the provisions of 6.3.5 of this regulation, an initial performance test is not required to be conducted under 6.0 of this regulation.
- 6.4.3 Monitoring to demonstrate continuous compliance. The owner or operator of an affected source subject to the emission limitations of 6.0 of this regulation shall conduct monitoring according to the type of air pollution control technique that is used to comply with the emission limitation. The monitoring required to demonstrate continuous compliance with the emission limitations is identified in 6.4 of this regulation for the air pollution control techniques expected to be used by the owners or operators of affected sources. As an alternative to the daily monitoring, the owner or operator of an affected source may install a continuous pressure monitoring system.
 - 6.4.3.1 Composite mesh-pad systems.
 - 6.4.3.1.1 During the initial performance test, the owner or operator of an affected source, or a group of affected sources under common control, complying with the emission limitations in 6.3 of this regulation through the use of a composite mesh-pad system shall determine the outlet chromium concentration using the test methods and procedures in 6.5.3 of this regulation, and shall establish as a site-specific operating parameter the pressure drop across the system, setting the value that corresponds to compliance with the applicable emission

limitation, using the procedures in 6.5.4.5 of this regulation. An owner or operator may conduct multiple performance tests to establish a range of compliant pressure drop values, or may set as the compliant value the average pressure drop measured over the three test runs of one performance test and accept ± 1 inch of water column from this value as the compliant range.

- 6.4.3.1.2 On and after the date on which the initial performance test is required to be completed under 3.7 of this regulation, the owner or operator of an affected source, or group of affected sources under common control, shall monitor and record the pressure drop across the composite mesh-pad system once each day that any affected source is operating. To be in compliance with the standards, the composite mesh-pad system shall be operated within ± 1 inch of water column of the pressure drop value established during the initial performance test, or shall be operated within the range of compliant values for pressure drop established during multiple performance tests.
- 6.4.3.1.3 The owner or operator of an affected source complying with the emission limitations in 6.3 of this regulation through the use of a composite mesh-pad system may repeat the performance test and establish as a new site-specific operating parameter the pressure drop across the composite mesh-pad system according to the requirements in 6.4.3.1.1 or 6.4.3.1.2 of this regulation. To establish a new site-specific operating parameter for pressure drop, the owner or operator shall satisfy the requirements specified in 6.4.3.1.3.1 through 6.4.3.1.3.4 of this regulation.
- 6.4.3.1.3.1 Determine the outlet chromium concentration using the test methods and procedures in 6.5.3 of this regulation;
- 6.4.3.1.3.2 Establish the site-specific operating parameter value using the procedures in 6.5.4.5 of this regulation;
- 6.4.3.1.3.3 Satisfy the recordkeeping requirements in 6.7.2.6 through 6.7.2.8 of this regulation; and
- 6.4.3.1.3.4 Satisfy the reporting requirements in 6.8.4 and 6.8.6 of this regulation.
- 6.4.3.1.4 The requirement to operate a composite mesh-pad system within the range of pressure drop values established in 6.4.3.1.1 through 6.4.3.1.3 of this regulation does not apply during automatic washdown cycles of the composite mesh-pad system.
- 6.4.3.2 Packed-bed scrubber systems.
- 6.4.3.2.1 During the initial performance test, the owner or operator of an affected source, or group of affected sources under common control, complying with the emission limitations in 6.3 of this regulation through the use of a packed-bed scrubber system shall determine the outlet chromium concentration using the procedures in 6.5.3 of this regulation, and shall establish as site-specific operating parameters the pressure drop across the system and the velocity pressure at the common inlet of the control device, setting the value that corresponds to compliance with the applicable emission limitation using the procedures in 6.5.4.4 and 6.5.4.5 of this regulation. An owner or operator may conduct multiple performance tests to establish a range of compliant operating parameter values. Alternatively, the owner or operator may set as the compliant value the average pressure drop and inlet velocity pressure measured over the three test runs of one performance test, and accept ± 1 inch of water column from the pressure drop value and $\pm 10\%$ from the velocity pressure value as the compliant range.
- 6.4.3.2.2 On and after the date on which the initial performance test is required to be completed under 3.7 of this regulation, the owner or operator of an affected source, or group of affected sources under common control, shall monitor and record the velocity pressure at the inlet to the packed-bed scrubber system and the pressure drop across the scrubber system once each day that any affected source is operating. To be in compliance with the standards, the scrubber system shall be operated within $\pm 10\%$ of the velocity pressure value established during the initial performance test and within ± 1 inch of water column of the pressure drop value established during the initial performance test or within the range of compliant operating parameter values established during multiple performance tests.
- 6.4.3.3 Packed-bed scrubber/composite mesh-pad system. The owner or operator of an affected source, or group of affected sources under common control, that uses a packed-bed scrubber in conjunction with a composite mesh-pad system to meet the emission limitations in 6.3 of this regulation shall comply with the monitoring requirements for composite mesh-pad systems as identified in 6.4.3.1 of this regulation.
- 6.4.3.4 Fiber-bed mist eliminator.
- 6.4.3.4.1 During the initial performance test, the owner or operator of an affected source, or group of affected sources under common control, complying with the emission limitations in 6.3 of this regulation through the use of a fiber-bed mist eliminator shall determine the outlet chromium concentration using the procedures in 6.5.3 of this regulation, and shall establish as a site-specific operating parameter the pressure drop across the fiber-bed mist eliminator and the pressure drop across the control device installed upstream of the fiber-bed to prevent plugging, setting the value that corresponds to compliance with the applicable emission limitation using the procedures in 6.5.4.5 of this regulation. An owner or operator may conduct multiple performance tests to establish a range of compliant pressure drop values, or may set as the compliant value the average pressure drop measured over the three test runs of one performance test and accept ± 1 inch of water column from this value as the compliant range.
- 6.4.3.4.2 On and after the date on which the initial performance test is required to be completed under 3.7 of this regulation, the owner or operator of an affected source, or group of affected sources under common control, shall 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, once each day that any affected source is operating. To be in compliance with the standards, the fiber-bed mist eliminator and the upstream control device shall be operated within ± 1 inch of water column of the pressure drop value established during the initial performance test or shall be operated within the range of compliant values for pressure drop established during multiple performance tests.
- 6.4.3.5 Wetting agent-type or combination wetting agent-type/foam blanket fume suppressants.
- 6.4.3.5.1 During the initial performance test, the owner or operator of an affected source complying with the emission limitations in 6.3 of this regulation through the use of a wetting agent in the electroplating or anodizing bath shall determine the outlet chromium concentration using the procedures in 6.5.3 of this regulation. The owner or operator shall establish as the site-specific operating parameter the surface tension of the bath using Method 306B in Appendix A of 40 CFR Part 63, setting the maximum value that corresponds to

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compliance with the applicable emission limitation. In lieu of establishing the maximum surface tension during the performance test, the owner or operator may accept as the maximum surface tension value the value in 6.4.3.5.1.1, 6.4.3.5.1.2, or 6.4.3.5.1.3 of this regulation, whichever is applicable. However, the owner or operator is exempt from conducting a performance test only if the criteria in 6.4.2.1 of this regulation are met.

- 6.4.3.5.1.1 Prior to September 19, 2014, the owner or operator of existing affected sources may accept 45 dynes/cm (3.1×10^{-3} lbf/ft) as measured by a stalagmometer or 35 dynes/cm (2.4×10^{-3} lbf/ft) as measured by a tensiometer as the maximum surface tension value.
- 6.4.3.5.1.2 On and after September 19, 2014, the owner or operator of existing affected sources may accept 40 dynes/cm (2.8×10^{-3} lbf/ft) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lbf/ft) as measured by a tensiometer as the maximum surface tension value.
- 6.4.3.5.1.3 The owner or operator of new or reconstructed affected sources may accept 40 dynes/cm (2.8×10^{-3} lbf/ft) as measured by a stalagmometer or 33 dynes/cm (2.3×10^{-3} lbf/ft) as measured by a tensiometer as the maximum surface tension value.
- 6.4.3.5.2 On and after the date on which the initial performance test is required to be completed under 3.7 of this regulation, the owner or operator of an affected source shall monitor the surface tension of the electroplating or anodizing bath. Operation of the affected source at a surface tension greater than the value established during the performance test or greater than the applicable maximum surface tension value in 6.4.3.5.1.1, 6.4.3.5.1.2, or 6.4.3.5.1.3 of this regulation, if the owner or operator is accepting this value in accordance with 6.4.3.5.1 of this regulation, shall constitute noncompliance with the standards. The surface tension shall be monitored according to the following schedule:
- 6.4.3.5.2.1 The surface tension shall be measured once every four hours during operation of the tank with a stalagmometer or a tensiometer as specified in Method 306B in Appendix A of 40 CFR Part 63.
- 6.4.3.5.2.2 The time between monitoring can be increased if there have been no exceedances. The surface tension shall be measured once every four 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, surface tension measurement may be conducted once every eight hours of tank operation. Once there are no exceedances during 40 hours of tank operation, surface tension measurement may be conducted once every 40 hours of tank operation on an ongoing basis, until an exceedance occurs. The minimum frequency of monitoring allowed by 6.0 of this regulation is once every 40 hours of tank operation.
- 6.4.3.5.2.3 Once an exceedance occurs as indicated through surface tension monitoring, the original monitoring schedule of once every four hours shall be resumed. A subsequent decrease in frequency shall follow the schedule laid out in 6.4.3.5.2.2 of this regulation. For example, if an owner or operator had been monitoring an affected source once every 40 hours and an exceedance occurs, subsequent monitoring would take place once every four hours of tank operation. Once an exceedance does not occur for 40 hours of tank operation, monitoring can occur once every eight hours of tank operation. Once an exceedance does not occur for 40 hours of tank operation on this schedule, monitoring can occur once every 40 hours of tank operation.
- 6.4.3.5.3 Once a bath solution is drained from the affected tank and a new solution added, the original monitoring schedule of once every four hours shall be resumed, with a decrease in monitoring frequency allowed following the procedures in 6.4.3.5.2.2 and 6.4.3.5.2.3 of this regulation.
- 6.4.3.6 Foam blanket-type fume suppressants.
- 6.4.3.6.1 During the initial performance test, the owner or operator of an affected source complying with the emission limitations in 6.3 of this regulation through the use of a foam blanket in the electroplating or anodizing bath shall determine the outlet chromium concentration using the procedures in 6.5.3 of this regulation and shall establish as the site-specific operating parameter the thickness of the foam blanket, setting the minimum thickness that corresponds to compliance with the applicable emission limitation. In lieu of establishing the minimum foam blanket thickness during the performance test, the owner or operator may accept 2.54 centimeters (one inch) as the minimum foam blanket thickness that corresponds to compliance with the applicable emission limitation. All foam blanket measurements shall be taken in close proximity to the part or cathode area in the plating tank or tanks.
- 6.4.3.6.2 On and after the date on which the initial performance test is required to be completed under 3.7 of this regulation, the owner or operator of an affected source shall monitor the foam blanket thickness of the electroplating or anodizing bath. Operation of the affected source at a foam blanket thickness less than the value established during the performance test or less than 2.54 cm (one inch) if the owner or operator is using this value in accordance with 6.4.3.6.1 of this regulation, shall constitute noncompliance with the standards. The foam blanket thickness shall be measured according to the following schedule:
- 6.4.3.6.2.1 The foam blanket thickness shall be measured once every hour of tank operation.
- 6.4.3.6.2.2 The time between monitoring can be increased if there have been no exceedances. The foam blanket thickness shall be measured once every hour of tank operation for the first 40 hours of tank operation after the compliance date. Once there are no exceedances for 40 hours of tank operation, foam blanket thickness measurement may be conducted once every four hours of tank operation. Once there are no exceedances during 40 hours of tank operation, foam blanket thickness measurement may be conducted once every four hours of tank operation on an ongoing basis, until an exceedance occurs. The minimum frequency of monitoring allowed by 6.0 of this regulation is once per four hours of tank operation.
- 6.4.3.6.2.3 Once an exceedance occurs as indicated through foam blanket thickness monitoring, the original monitoring schedule of once every hour shall be resumed. A subsequent decrease in frequency shall follow the schedule laid out in 6.4.3.6.2.2 of this regulation. For example, if an owner or operator had been monitoring an affected source once every four hours and an

exceedance occurs, subsequent monitoring would take place once every hour of tank operation. Once an exceedance does not occur for 40 hours of tank operation, monitoring can occur once every four hours of tank operation. Once an exceedance does not occur for 40 hours of tank operation on this schedule, monitoring can occur once every four hours of tank operation.

- 6.4.3.6.3 Once a bath solution is drained from the affected tank and a new solution added, the original monitoring schedule of once every hour shall be resumed, with a decrease in monitoring frequency allowed following the procedures in 6.4.3.6.2.2 and 6.4.3.6.2.3 of this regulation.
- 6.4.3.7 Fume suppressant/add-on control device.
- 6.4.3.7.1 If the owner or operator of an affected source uses both a fume suppressant and add-on control device and both are needed to comply with the applicable emission limitation, the applicable monitoring requirements as identified 6.4.3.1 through 6.4.3.6 of this regulation and the operation and maintenance procedures of Table 6-1 of this regulation apply for each of the control techniques used.
- 6.4.3.7.2 If the owner or operator of an affected source uses both a fume suppressant and add-on control device, but only one of these techniques is needed to comply with the applicable emission limitation, the applicable monitoring requirements as identified in 6.4.3.1 through 6.4.3.6 of this regulation and the operation and maintenance procedures of Table 6-1 of this regulation apply only for the control technique used to achieve compliance.
- 6.4.3.8 Use of an alternative monitoring method.
- 6.4.3.8.1 Requests and approvals of alternative monitoring methods shall be considered in accordance with 3.8.6.1, 3.8.6.3, 3.8.6.4, and 3.8.6.5 of this regulation.
- 6.4.3.8.2 After receipt and consideration of an application for an alternative monitoring method, the Administrator may approve alternatives to any monitoring methods or procedures of 6.0 of this regulation including, but not limited to, the following:
- 6.4.3.8.2.1 Alternative monitoring requirements when installation or use of monitoring devices specified in 6.0 of this regulation would not provide accurate measurements due to interferences caused by substances within the effluent gases or
- 6.4.3.8.2.2 Alternative locations for installing monitoring devices when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements.
- 6.4.4 An owner or operator who uses an air pollution control device not listed in 6.4 of this regulation shall submit to the Administrator (with copy to the Department) a description of the device, test results collected in accordance with 6.5.3 of this regulation verifying the performance of the device for reducing chromium emissions to the atmosphere to the level required by 6.0 of this regulation, a copy of the operation and maintenance plan referenced in 6.3.6 of this regulation including operation and maintenance procedures and housekeeping procedures, and appropriate operating parameters that will be monitored to establish continuous compliance with the standards. The monitoring plan submitted identifying the continuous compliance monitoring is subject to the Administrator's approval.
- 6.5 Performance test requirements and test methods.
- 6.5.1 Performance test requirements. Performance tests shall be conducted using the test methods and procedures in 6.5 and 3.7 of this regulation. Performance tests shall be conducted under such conditions as the Department specifies to the owner or operator based on representative performance of the affected source for the period being tested. Upon request, the owner or operator shall make available to the Department such records as may be necessary to determine the conditions of performance tests. Performance test results shall be documented in complete test reports that contain the information required in 6.5.1.1 through 6.5.1.9 of this regulation. The test plan to be followed shall be made available to the Department prior to the testing, if requested.
- 6.5.1.1 A brief process description;
- 6.5.1.2 Sampling location description or descriptions;
- 6.5.1.3 A description of sampling and analytical procedures and any modifications to standard procedures;
- 6.5.1.4 Test results;
- 6.5.1.5 Quality assurance procedures and results;
- 6.5.1.6 Records of operating conditions during the test, preparation of standards, and calibration procedures;
- 6.5.1.7 Raw data sheets for field sampling and field and laboratory analyses;
- 6.5.1.8 Documentation of calculations; and
- 6.5.1.9 Any other information required by the test method.
- 6.5.2 Other performance testing options and limitations.
- 6.5.2.1 If the owner or operator of an existing affected source conducted performance testing within the last five years, the results of such testing may be used to demonstrate compliance with the applicable emission limitations in 6.3.3.1.2, 6.3.3.2.2, 6.3.3.3, and 6.3.4.2 of this regulation if:
- 6.5.2.1.1 The test methods and procedures identified in 6.5.3 of this regulation were used during the performance test;

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- 6.5.2.1.2 The performance test was conducted under operating conditions that are representative of the conditions by which the affected source will be operated on and after September 19, 2014;
- 6.5.2.1.3 The affected source used the same add-on air pollution control device or devices that will be operated on and after September 19, 2014;
- 6.5.2.1.4 The performance test report contains the elements required in 6.5.1 of this regulation; and
- 6.5.2.1.5 The owner or operator of the affected source for which the performance test was conducted has sufficient data to establish the operating parameter value or values that correspond to compliance with the standards, as required for continuous compliance monitoring in 6.4.3 of this regulation.
- 6.5.2.2 [Reserved]
- 6.5.3 Test methods. Each owner or operator subject to the provisions of 6.0 of this regulation and required in 6.4.2 of this regulation to conduct an initial performance test shall use the test methods identified in 6.0 to demonstrate compliance with the standards in 6.3 of this regulation.
 - 6.5.3.1 Method 306 or Method 306A, "Determination of Chromium Emissions From Decorative and Hard Chromium Electroplating and Anodizing Operations," in Appendix A of 40 CFR Part 63 shall be used to determine the chromium concentration from hard or decorative chromium electroplating tanks or chromium anodizing tanks. The sampling time and sample volume for each run of Methods 306 and 306A in Appendix of 40 CFR Part 63 shall be at least 120 minutes and 1.70 dscm (60 dscf), respectively. Methods 306 and 306A in Appendix A of 40 CFR Part 63 allow the measurement of either total chromium or hexavalent chromium emissions. For the purposes of 6.0 of this regulation, sources using chromic acid baths shall demonstrate compliance with the emission limitations of 6.3 of this regulation by measuring the total chromium.
 - 6.5.3.2 The California Air Resources Board (CARB) Method 425 (which is available by contacting the California Air Resources Board, P.O. Box 2815, Sacramento, California 95812) may be used to determine the chromium concentration from hard and decorative chromium electroplating tanks and chromium anodizing tanks if the following conditions are met:
 - 6.5.3.2.1 If a colorimetric analysis method is used, the sampling time and volume shall be sufficient to result in 33 to 66 micrograms of catch in the sampling train.
 - 6.5.3.2.2 If Atomic Absorption Graphite Furnace (AAGF) or Ion Chromatography with a Post-column Reactor (ICPCR) analyses were used, the sampling time and volume should be sufficient to result in a sample catch that is 5 to 10 times the minimum detection limit of the analytical method (i.e., 1.0 microgram per liter of sample for AAGF and 0.5 microgram per liter of sample for ICPCR).
 - 6.5.3.2.3 In the case of either 6.5.3.2.1 or 6.5.3.2.2 of this regulation, a minimum of three separate runs shall be conducted. The other requirements of 3.7 of this regulation that apply to affected sources, as indicated in Table 6-3 of this regulation, shall also be met.
 - 6.5.3.3 Method 306B, "Surface Tension Measurement and Recordkeeping for Tanks Used at Decorative Chromium Electroplating and Anodizing Facilities" in Appendix A of 40 CFR Part 63 shall be used to measure the surface tension of electroplating and anodizing baths.
 - 6.5.3.4 Alternate test methods may also be used if the method has been validated using Method 301 in Appendix A of 40 CFR Part 63 and if approved by the Administrator. Procedures for requesting and obtaining approval are contained in 3.7.5 of this regulation.
 - 6.5.3.5 The South Coast Air Quality Management District (SCAQMD) Method 205.1, dated August 1991, may be used to determine the total chromium concentration from hard and decorative chromium electroplating tanks and chromium anodizing tanks.
- 6.5.4 Establishing site-specific operating parameter values.
 - 6.5.4.1 Each owner or operator required to establish site-specific operating parameters shall follow the procedures in 6.5 of this regulation.
 - 6.5.4.2 All monitoring equipment shall be installed such that representative measurements of emissions or process parameters from the affected source are obtained. For monitoring equipment purchased from a vendor, verification of the operational status of the monitoring equipment shall include execution of the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.
 - 6.5.4.2.1 Specifications for differential pressure measurement devices used to measure velocity pressure shall be in accordance with Section 3.2 of Method 2 in Appendix A of 40 CFR Part 60.
 - 6.5.4.2.2 Specification for differential pressure measurement devices used to measure pressure drop across a control system shall be in accordance with manufacturer's accuracy specifications.
 - 6.5.4.3 The surface tension of electroplating and anodizing baths shall be measured using Method 306B, "Surface Tension Measurement and Recordkeeping for Tanks used at Decorative Chromium Electroplating and Anodizing Facilities" in Appendix A of 40 CFR Part 63. This method should also be followed when wetting agent type or combination wetting agent/foam blanket type fume suppressants are used to control chromium emissions from a hard chromium electroplating tank and surface tension measurement is conducted to demonstrate continuous compliance.
 - 6.5.4.4 The owner or operator of a source required to measure the velocity pressure at the inlet to an add-on air pollution control device in accordance with 6.4.3.2 of this regulation, shall establish the site-specific velocity pressure as follows:

- 6.5.4.4.1 Locate a velocity traverse port in a section of straight duct that connects the hooding on the plating tank or tanks with the control device. The port shall be located as close to the control system as possible, and shall be placed a minimum of two duct diameters downstream and 0.5 duct diameter upstream of any flow disturbance such as a bend, expansion, or contraction (see Method 1 in Appendix A of 40 CFR Part 60). If 2.5 diameters of straight ductwork do not exist, locate the port 0.8 of the duct diameter downstream and 0.2 of the duct diameter upstream from any flow disturbance.
- 6.5.4.4.2 A 12-point velocity traverse of the duct to the control device shall be conducted along a single axis according to Method 2 in Appendix A of 40 CFR Part 60 using an S-type pitot tube; measurement of the barometric pressure and duct temperature at each traverse point is not required, but is suggested. Mark the S-type pitot tube as specified in Method 1 in Appendix A of 40 CFR Part 60 with 12 points. Measure the velocity pressure (p) values for the velocity points and record. Determine the square root of the individual velocity point p values and average. The point with the square root value that comes closest to the average square root value is the point of average velocity. The p value measured for this point during the performance test will be used as the reference for future monitoring.
- 6.5.4.5 The owner or operator of a source required to measure the pressure drop across the add-on air pollution control device in accordance with 6.4.3.1 through 6.4.3.4 of this regulation may establish the pressure drop in accordance with the following guidelines:
- 6.5.4.5.1 Pressure taps shall be installed at any of the following locations:
- 6.5.4.5.1.1 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;
- 6.5.4.5.1.2 On each side of the packed bed within the control system or on each side of each mesh pad within the control system; or
- 6.5.4.5.1.3 On the front side of the first mesh pad and back side of the last mesh pad within the control system.
- 6.5.4.5.2 Pressure taps shall be sited at locations that are:
- 6.5.4.5.2.1 Free from pluggage as possible and away from any flow disturbances such as cyclonic demisters.
- 6.5.4.5.2.2 Situated such that no air infiltration at measurement site will occur that could bias the measurement.
- 6.5.4.5.3 Pressure taps shall be constructed of either polyethylene, polybutylene, or other nonreactive materials.
- 6.5.4.5.4 Nonreactive plastic tubing shall be used to connect the pressure taps to the device used to measure pressure drop.
- 6.5.4.5.5 Any of the following pressure gauges can be used to monitor pressure drop: a magnehelic gauge, an inclined manometer, or a "U" tube manometer.
- 6.5.4.5.6 Prior to connecting any pressure lines to the pressure gauge or gauges, each gauge should be zeroed. No calibration of the pressure gauges is required.
- 6.5.5 Special compliance provisions for multiple sources controlled by a common add-on air pollution control device.
- 6.5.5.1 Procedures for measuring the outlet chromium concentration from an add-on air pollution control device that is used to control multiple sources that may or may not include sources not affected by 6.0 of this regulation are identified in 6.5 of this regulation.
- 6.5.5.2 When multiple affected sources performing the same type of operation (e.g., all are performing hard chromium electroplating) and subject to the same emission limitation are controlled with an add-on air pollution control device that is not controlling emissions from any other type of affected operation or from any nonaffected sources, the applicable emission limitation identified in 6.3 of this regulation shall be met at the outlet of the add-on air pollution control device.
- 6.5.5.3 When multiple affected sources performing the same type of operation and subject to the same emission limitation are controlled with a common add-on air pollution control device that is also controlling emissions from sources not affected by these standards, the following procedures should be followed to determine compliance with the applicable emission limitation in 6.3 of this regulation:
- 6.5.5.3.1 Calculate the cross-sectional area of each inlet duct (i.e., uptakes from each hood) including those not affected by the standard.
- 6.5.5.3.2 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 sources, and then multiply this number by two hours. The calculated time is the minimum sample time required per test run.
- 6.5.5.3.3 Perform Method 306 or 306A testing and calculate an outlet mass emission rate.
- 6.5.5.3.4 Determine the total ventilation rate from the affected sources (VR_{inlet}) by using equation 6-1:
- $$VR_{inlet} = VR_{tot} * IDA_i / IA_{total} \quad (6-1)$$
- where:
- VR_{inlet} = the total ventilation rate from all inlet ducts associated with affected sources;
- VR_{tot} = the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by means of the Method 306 or 306A testing;

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IDA_i = the total inlet area for all ducts associated with affected sources; and

IA_{total} = the sum of all inlet duct areas from both affected and nonaffected sources.

6.5.5.3.5 Establish the allowable mass emission rate of the system (AMR_{sys}) in milligrams of total chromium per hour (mg/hr) using equation 6-2:

$$AMR_{sys} = VR_{inlet} * EL * 60 \text{ minutes/hour} \quad (6-2)$$

where:

AMR_{sys} = the allowable mass emission rate of the system in mg/hr;

VR_{inlet} = the total ventilation rate from the affected sources in dscm/min; and

EL = the applicable emission limitation in 6.3 of this regulation in mg/dscm.

The allowable mass emission rate (AMR_{sys}) calculated from equation 6-2 of this regulation should be equal to or more than the outlet three-run average mass emission rate determined from Method 306 or 306A testing in order for the source to be in compliance with the standard.

6.5.5.4 When multiple affected sources performing different types of operations (e.g., hard chromium electroplating, decorative chromium electroplating, or chromium anodizing) are 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, or if the affected sources controlled by the common add-on air pollution control device perform the same operation but are subject to different emission limitations (e.g., because one is a new hard chromium plating tank and one is an existing small, hard chromium plating tank), the following procedures should be followed to determine compliance with the applicable emission limitation in 6.3 of this regulation:

6.5.5.4.1 Follow the steps outlined in 6.5.5.3.1 through 6.5.5.3.3 of this regulation.

6.5.5.4.2 Determine the total ventilation rate for each type of affected source ($VR_{inlet,a}$) using equation 6-3:

$$VR_{inlet,a} = VR_{tot} * IDA_{i,a} / IA_{total} \quad (6-3)$$

where:

$VR_{inlet,a}$ = 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;

VR_{tot} = the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by means of the Method 306 or 306A testing;

$IDA_{i,a}$ = 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; and

A_{total} = the sum of all duct areas from both affected and nonaffected sources.

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

$$AMR_{hc1} = VR_{hc1} * EL_{hc1} * 60 \text{ minutes/hour} \quad (6-4)$$

$$AMR_{hc2} = VR_{hc2} * EL_{hc2} * 60 \text{ minutes/hour} \quad (6-5)$$

$$AMR_{dc} = VR_{dc} * EL_{dc} * 60 \text{ minutes/hour} \quad (6-6)$$

$$AMR_{ca} = VR_{ca} * EL_{ca} * 60 \text{ minutes/hour} \quad (6-7)$$

where:

AMR = the allowable mass emission rate in mg/hr for each type of affected source;

VR = the total ventilation rate from all inlet ducts conveying chromic acid;

EL = the applicable emission limitation in 6.3 of this regulation 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); and

“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; and

“ca” applies to the total of ventilation rates for the chromium anodizing tanks.

- 6.5.5.4.4 Establish the allowable mass emission rate (AMR_{sys}) in milligrams of total chromium per hour (mg/hr) using equation 6-8, including each type of affected source as appropriate:

$$AMR_{sys} = AMR_{hc1} + AMR_{hc2} + AMR_{dc} + AMR_{ca} \quad (6-8)$$

The allowable mass emission rate calculated from equation 6-8 should be equal to or more than the outlet three-run average mass emission rate determined from Method 306 or 306A testing in order for the source to be in compliance with the standards.

- 6.5.5.5 Each owner or operator that uses the special compliance provisions in 6.5.5 of this regulation to demonstrate compliance with the emission limitations in 6.3 of this regulation shall submit the measurements and calculations to support these compliance methods with the notification of compliance status required in 6.8.5 of this regulation.

- 6.5.5.6 Each owner or operator that uses the special compliance provisions in 6.5 of this regulation to demonstrate compliance with the emission limitations in 6.3 of this regulation shall repeat these procedures if a tank is added or removed from the control system regardless of whether that tank is a nonaffected source. If the new nonaffected tank replaces an existing nonaffected tank of the same size and is connected to the control system through the same size inlet duct then this procedure does not have to be repeated.

- 6.5.6 Compliance provisions for the mass emission rate standard for enclosed hard chromium electroplating tanks.

- 6.5.6.1 Procedures for calculating the maximum allowable mass emission rate for owners or operators who choose to meet the mass emission rate standard in 6.3.3.2.1.5 of this regulation prior to September 19, 2014.

- 6.5.6.1.1 The owner or operator of an existing enclosed hard chromium electroplating tank that is an affected source who chooses to meet the mass emission rate standard in 6.3.3.2.1.5 of this regulation shall determine compliance by not allowing the mass rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate (MAMER) calculated using equation 6-9, if the existing enclosed hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility:

$$MAMER = ETSA * K * 0.015 \text{ mg/dscm} \quad (6-9)$$

where:

MAMER = the maximum allowable mass emission rate for enclosed hard chromium electroplating tanks in mg/hr;

ETSA = the hard chromium electroplating tank surface area in square feet (ft^2); and

K = the conversion factor, 425 dscm/ $(\text{ft}^2\text{-hr})$.

- 6.5.6.1.2 Compliance with the mass emission rate standard is demonstrated if the three-run average mass emission rate determined from testing using Method 306 in Appendix A of 40 CFR Part 63 is less than or equal to the maximum allowable mass emission rate (MAMER) calculated from equation 6-9.

- 6.5.6.2 Procedures for calculating the maximum allowable mass emission rate for owners or operators who choose to meet the mass emission rate standard in 6.3.3.2.1.4 of this regulation prior to September 19, 2014.

- 6.5.6.2.1 The owner or operator of an existing enclosed hard chromium electroplating tank that is an affected source who chooses to meet the mass emission rate standard in 6.3.3.2.1.4 of this regulation shall determine compliance by not allowing the mass rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate (MAMER) calculated using equation 6-10, if the existing enclosed hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility:

$$MAMER = ETSA * K * 0.03 \text{ mg/dscm} \quad (6-10)$$

where:

MAMER = the maximum allowable mass emission rate for enclosed hard chromium electroplating tanks in mg/hr;

ETSA = the hard chromium electroplating tank surface area in square feet (ft^2); and

K = the conversion factor, 425 dscm/ $(\text{ft}^2\text{-hr})$.

- 6.5.6.2.2 Compliance with the mass emission rate standard is demonstrated if the three-run average mass emission rate determined from testing using Method 306 in Appendix A of 40 CFR Part 63 is less than or equal to the maximum allowable mass emission rate (MAMER) calculated from equation 6-10.

- 6.5.6.3 Procedures for calculating the maximum allowable mass emission rate for owners or operators who choose to meet the mass emission rate standard in 6.3.3.2.2.5 of this regulation on and after September 19, 2014.

- 6.5.6.3.1 The owner or operator of an existing enclosed hard chromium electroplating tank that is an affected source who chooses to meet the mass emission rate standard in 6.3.3.2.2.5 of this regulation shall determine compliance by not allowing the mass rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate (MAMER) calculated using equation 6-11, if the existing enclosed hard chromium electroplating tank had an initial startup after December 16, 1993 or is located at a large, hard chromium electroplating facility:

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$$\text{MAMER} = \text{ETSA} * \text{K} * 0.011 \text{ mg/dscm} \quad (6-11)$$

where:

MAMER = the maximum allowable mass emission rate for enclosed hard chromium electroplating tanks in mg/hr;

ETSA = the hard chromium electroplating tank surface area in square feet (ft²); and

K = the conversion factor, 425 dscm/(ft²-hr).

6.5.6.3.2 Compliance with the mass emission rate standard is demonstrated if the three-run average mass emission rate determined from testing using Method 306 in Appendix A of 40 CFR Part 63 is less than or equal to the maximum allowable mass emission rate (MAMER) calculated from equation 6-11.

6.5.6.4 Procedures for calculating the maximum allowable mass emission rate for owners or operators who choose to meet the mass emission rate standard in 6.3.3.2.2.4 of this regulation on and after September 19, 2014.

6.5.6.4.1 The owner or operator of an existing enclosed hard chromium electroplating tank that is an affected source who chooses to meet the mass emission rate standard in 6.3.3.2.2.4 of this regulation shall determine compliance by not allowing the mass rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate (MAMER) calculated using equation 6-12, if the existing enclosed hard chromium electroplating tank had an initial startup on or before December 16, 1993 and is located at a small, hard chromium electroplating facility:

$$\text{MAMER} = \text{ETSA} * \text{K} * 0.015 \text{ mg/dscm} \quad (6-12)$$

where:

MAMER = the maximum allowable mass emission rate for enclosed hard chromium electroplating tanks in mg/hr;

ETSA = the hard chromium electroplating tank surface area in square feet (ft²); and

K = the conversion factor, 425 dscm/(ft²-hr).

6.5.6.4.2 Compliance with the mass emission rate standard is demonstrated if the three-run average mass emission rate determined from testing using Method 306 in Appendix A of 40 CFR Part 63 is less than or equal to the maximum allowable mass emission rate (MAMER) calculated from equation 6-12.

6.5.6.5 Procedures for calculating the maximum allowable mass emission rate for owners or operators of a new or reconstructed affected source who choose to meet the mass emission rate standard in 6.3.3.2.3.3 of this regulation.

6.5.6.5.1 The owner or operator of a new or reconstructed enclosed hard chromium electroplating tank that is an affected source who chooses to meet the mass emission rate standard in 6.3.3.2.3.3 of this regulation shall determine compliance by not allowing the mass rate of total chromium in the exhaust gas stream discharged to the atmosphere to exceed the maximum allowable mass emission rate calculated using equation 6-13:

$$\text{MAMER} = \text{ETSA} * \text{K} * 0.006 \text{ mg/dscm} \quad (6-13)$$

where:

MAMER = the maximum allowable mass emission rate for enclosed hard chromium electroplating tanks in mg/hr;

ETSA = the hard chromium electroplating tank surface area in square feet (ft²); and

K = the conversion factor, 425 dscm/(ft²-hr).

6.5.6.5.2 Compliance with the mass emission rate standard is demonstrated if the three-run average mass emission rate determined from testing using Method 306 or 306A in Appendix A of 40 CFR Part 63 is less than or equal to the maximum allowable mass emission rate calculated from equation 6-13.

6.6 Provisions for new and reconstructed sources.

6.6.1 The preconstruction review requirements for new and reconstructed affected sources that are subject to, or become subject to, 6.0 of this regulation are identified in 6.6 of this regulation.

6.6.2 New or reconstructed affected sources. The owner or operator of a new or reconstructed affected source is subject to applicable requirements of 3.5 of this regulation, as noted in Table 6-3 of this regulation, as well as the provisions of 6.6.2 of this regulation.

6.6.2.1 After September 11, 1999, no person may construct a new affected source or reconstruct an affected source subject to 6.0 of this regulation, or reconstruct a source such that it becomes an affected source subject to 6.0, without submitting a notification of construction or reconstruction to the Department. The notification shall contain the information identified in 6.6.2.2 and 6.6.2.3 of this regulation, as appropriate.

- 6.6.2.2 The notification of construction or reconstruction required in 6.6.2.1 of this regulation shall include:
- 6.6.2.2.1 The owner or operator's name, title, and address;
 - 6.6.2.2.2 The address (i.e., physical location) or proposed address of the affected source if different from the owner or operator's address;
 - 6.6.2.2.3 A notification of intention to construct a new affected source or make any physical or operational changes to an affected source that may meet or has been determined to meet the criteria for a reconstruction as defined in 3.2 of this regulation;
 - 6.6.2.2.4 An identification of 6.0 of this regulation as the basis for the notification;
 - 6.6.2.2.5 The expected commencement and completion dates of the construction or reconstruction;
 - 6.6.2.2.6 The anticipated date of initial startup of the affected source;
 - 6.6.2.2.7 The type of process operation to be performed (hard or decorative chromium electroplating or chromium anodizing);
 - 6.6.2.2.8 A description of the air pollution control technique to be used to control emissions from the affected source, such as preliminary design drawings and design capacity if an add-on air pollution control device is used; and
 - 6.6.2.2.9 An estimate of emissions from the source based on engineering calculations and vendor information on control device efficiency, expressed in units consistent with the emission limitations of 6.0 of this regulation. Calculations of emission estimates should be in sufficient detail to permit assessment of the validity of the calculations.
- 6.6.2.3 If a reconstruction is to occur, the notification required in 6.6.2.1 of this regulation shall include the following in addition to the information required in 6.6.2.2 of this regulation:
- 6.6.2.3.1 A brief description of the affected source and the components to be replaced;
 - 6.6.2.3.2 A brief description of the present and proposed emission control technique, including the information required in 6.6.2.2.8 and 6.6.2.2.9 of this regulation;
 - 6.6.2.3.3 An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new source;
 - 6.6.2.3.4 The estimated life of the affected source after the replacements; and
 - 6.6.2.3.5 A discussion of any economic or technical limitations the source may have in complying with relevant standards or other requirements after the proposed replacements. The discussion shall be sufficiently detailed to demonstrate to the Department's satisfaction that the technical or economic limitations affect the source's ability to comply with 6.0 of this regulation and how they do so.
 - 6.6.2.3.6 If in the notification of reconstruction, the owner or operator designates the affected source as a reconstructed source and declares that there are no economic or technical limitations to prevent the source from complying with 6.0 of this regulation, the owner or operator need not submit the information required in 6.6.2.3.3 through 6.6.2.3.5 of this regulation.
- 6.6.2.4 Departmental approvals.
- 6.6.2.4.1 The owner or operator of a new or reconstructed affected area source that submits a notification in accordance with 6.6.2.1 through 6.6.2.3 of this regulation is not subject to approval by the Department. Construction or reconstruction is subject only to notification and can begin upon submission of a complete notification. Notwithstanding the previous sentence, construction or reconstruction can not commence prior to receipt of the Department's approval of the 7 DE Admin. Code 1102 permit to construct application.
 - 6.6.2.4.2 The owner or operator of a new or reconstructed affected major source that submits a notification in accordance with 6.6.2.1 through 6.6.2.3 of this regulation and an application for approval of construction or reconstruction in accordance with requirements of 3.5 of this regulation is subject to approval by the Department. Construction or reconstruction can not commence prior to receipt of the Department's approval of the application for approval of construction or reconstruction or approval of the 7 DE Admin. Code 1102 permit to construct application.
 - 6.6.2.4.3 Additionally, the owner or operator of a new or reconstructed affected source may be required to obtain an approved construction permit under 7 DE Admin. Code 1102 of the State of Delaware "Regulations Governing the Control of Air Pollution", before commencing construction or reconstruction.
- 6.6.2.5 Submittal timeframes. After September 11, 1999, an owner or operator of a new or reconstructed affected source shall submit the notification of construction or reconstruction required in 6.6.2.1 of this regulation or the application for approval of construction or reconstruction required by 3.5 of this regulation according to the following schedule:
- 6.6.2.5.1 If construction or reconstruction commences after September 11, 1999, the notification or application shall be submitted as soon as practicable before the construction or reconstruction is planned to commence.
 - 6.6.2.5.2 If the construction or reconstruction had commenced and initial startup had not occurred before September 11, 1999, the notification or application shall be submitted as soon as practicable after September 11, 1999.

6.7 Recordkeeping requirements.

- 6.7.1 The owner or operator of each affected source subject to these standards shall fulfill all recordkeeping requirements of 6.7 of this regulation and of 3.0 of this regulation as identified in Table 6-3 of this regulation.

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- 6.7.2 The owner or operator of an affected source subject to the provisions of 6.0 of this regulation shall maintain the following records for such source:
- 6.7.2.1 Inspection records for the add-on air pollution control device, if such a device is used, and monitoring equipment, to document that the inspection and maintenance required by the operation and maintenance procedures in 6.3.6 of this regulation and Table 6-1 of this regulation have taken place. The record can take the form of a checklist and should 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.
 - 6.7.2.2 Records of all maintenance performed on the affected source, the add-on air pollution control device, and monitoring equipment;
 - 6.7.2.3 Records of the occurrence, duration, and cause (if known) of each malfunction of process, add-on air pollution control, and monitoring equipment;
 - 6.7.2.4 Records of actions taken during periods of malfunction to minimize emissions in accordance with 6.3.1.2 of this regulation, including corrective actions to restore malfunctioning process, air pollution control equipment, and monitoring equipment to its normal or usual manner of operation;
 - 6.7.2.5 Other records, which may take the form of checklists, necessary to demonstrate consistency with the provisions of the operation and maintenance plan required in 6.3.6.3 of this regulation;
 - 6.7.2.6 Test reports documenting results of all performance tests;
 - 6.7.2.7 All measurements as may be necessary to determine the conditions of performance tests, including measurements necessary to determine compliance with the special compliance provisions in 6.5.5 of this regulation;
 - 6.7.2.8 Records of monitoring data required in 6.4.3 of this regulation that are used to demonstrate compliance with the standard including the date and time the data are collected;
 - 6.7.2.9 The specific identification (i.e., the date and time of commencement and completion) of each period of excess emissions, as indicated by monitoring data, that occurs during malfunction of the process, add-on air pollution control, or monitoring equipment;
 - 6.7.2.10 The specific identification (i.e., the date and time of commencement and completion) of each period of excess emissions, as indicated by monitoring data, that occurs during periods other than malfunction of the process, add-on air pollution control, or monitoring equipment;
 - 6.7.2.11 The total process operating time of the affected source during the reporting period;
 - 6.7.2.12 Records of the actual cumulative rectifier capacity of hard chromium electroplating tanks at a facility expended during each month of the reporting period, and the total capacity expended to date for a reporting period, if the owner or operator is using the actual cumulative rectifier capacity to determine facility size in accordance with 6.3.3.3 of this regulation;
 - 6.7.2.13 For sources using fume suppressants to comply with the standards, records of the date and time that fume suppressants are added to the electroplating or anodizing bath and records of the fume suppressant manufacturer and product name;
 - 6.7.2.14 For sources complying with 6.3.5 of this regulation, records of the bath components purchased, with the wetting agent clearly identified as a bath constituent contained in one of the components;
 - 6.7.2.15 Any information demonstrating whether a source is meeting the requirements for a waiver of recordkeeping or reporting requirements, if the source has been granted a waiver under 3.10.6 of this regulation; and
 - 6.7.2.16 All documentation supporting the notifications and reports required by 6.8 of this regulation and by 3.9 and 3.10 of this regulation, as identified in Table 6-3 of this regulation.
 - 6.7.2.17 There are no recordkeeping requirements associated with the housekeeping procedures in Table 6-2 of this regulation.
- 6.7.3 All records shall be maintained for a period of five years in accordance with 3.10.2.1 of this regulation.
- 6.8 Reporting requirements.
- 6.8.1 The owner or operator of each affected source subject to these standards shall fulfill all reporting requirements outlined in 6.8 of this regulation and in 3.0 of this regulation as identified in Table 6-3 of this regulation. These reports shall be made to the Department and to the Administrator, in accordance with 3.10.1.4 of this regulation.
 - 6.8.1.1 Reports required by 6.8 and 3.0 of this regulation may be sent by U.S. mail, fax, or by another courier.
 - 6.8.1.1.1 Submittals sent by U.S. mail shall be postmarked on or before the specified submittal date.
 - 6.8.1.1.2 Submittals sent by other methods shall be received by the Department and the Administrator on or before the specified submittal date.
 - 6.8.1.2 If acceptable to both the Department and the owner or operator of an affected source, reports may be submitted on electronic media.
 - 6.8.2 The reporting requirements in 6.8 of this regulation apply to the owner or operator of an affected source when such source becomes subject to the provisions of 6.0 of this regulation.

6.8.3 Initial notifications.

6.8.3.1 The owner or operator of an affected source that has an initial startup before September 11, 1999, shall notify the Department in writing that the source is subject to 6.0 of this regulation. The notification shall be submitted no later than September 11, 1999, and shall contain the following information:

6.8.3.1.1 The name, title, and address of the owner or operator;

6.8.3.1.2 The address (i.e., physical location) of each affected source;

6.8.3.1.3 A statement that 6.0 of this regulation is the basis for this notification;

6.8.3.1.4 Identification of the applicable emission limitation and compliance date for each affected source;

6.8.3.1.5 A brief description of each affected source, including the type of process operation performed;

6.8.3.1.6 For sources performing hard chromium electroplating, the maximum cumulative potential rectifier capacity;

6.8.3.1.7 For sources performing hard chromium electroplating, a statement of whether the affected source or sources is located at a small or a large, hard chromium electroplating facility and whether this will be demonstrated through actual or maximum cumulative potential rectifier capacity;

6.8.3.1.8 For sources performing hard chromium electroplating, a statement of whether the owner or operator of an affected source or sources will limit the maximum cumulative potential rectifier capacity in accordance with 6.3.3.3 of this regulation such that the hard chromium electroplating facility is considered small; and

6.8.3.1.9 A statement of whether the affected source is located at a major source or an area source as defined in 3.2 of this regulation.

6.8.3.2 The owner or operator of a new or reconstructed affected source that has an initial startup after January 25, 1995 shall submit an initial notification, in addition to the notification of construction or reconstruction required in 6.6.2 of this regulation, as follows:

6.8.3.2.1 A notification of the date when construction or reconstruction was commenced, shall be submitted simultaneously with the notification of construction or reconstruction, if construction or reconstruction was commenced before September 11, 1999;

6.8.3.2.2 A notification of the date when construction or reconstruction was commenced, shall be submitted no later than 30 calendar days after such date, if construction or reconstruction was commenced after September 11, 1999; and

6.8.3.2.3 A notification of the actual date of startup of the source shall be submitted by September 11, 1999 or within 30 calendar days after startup, whichever is later.

6.8.4 Notification of performance test.

6.8.4.1 The owner or operator of an affected source shall notify the Department in writing of his or her intention to conduct a performance test at least 60 calendar days before the test is scheduled to begin to allow the Department to have an observer present during the test. Observation of the performance test by the Department is optional.

6.8.4.2 In the event the owner or operator is unable to conduct the performance test as scheduled, the provisions of 3.7.2.2 of this regulation apply.

6.8.5 Notification of compliance status.

6.8.5.1 A notification of compliance status is required each time that an affected source becomes subject to the requirements of 6.0 of this regulation.

6.8.5.2 If the State in which the source is located has not been delegated the authority to implement the rule, each time a notification of compliance status is required under this regulation, the owner or operator of an affected source shall submit to the Administrator (with copy to the Department) a notification of compliance status, signed by the responsible official (as defined in 3.2 of this regulation) who shall certify its accuracy, attesting to whether the affected source has complied with 6.0 of this regulation. If the State has been delegated the authority, the notification of compliance status shall be submitted to the Department (with copy to the Administrator). The notification shall list for each affected source:

6.8.5.2.1 The applicable emission limitation and the methods that were used to determine compliance with this limitation;

6.8.5.2.2 If a performance test is required by 6.0 of this regulation, the test report documenting the results of the performance test, which contains the elements required in 6.5.1 of this regulation, including measurements and calculations to support the special compliance provisions in 6.5.5 of this regulation if these are being followed;

6.8.5.2.3 The type and quantity of hazardous air pollutants emitted by the source reported in mg/dscm or mg/hr if the source is using the special provisions in 6.5.5 of this regulation to comply with the standards. (If the owner or operator is subject to the construction and reconstruction provisions in 6.6 of this regulation and had previously submitted emission estimates, the owner or operator shall state that this report corrects or verifies the previous estimate.) For sources not required to conduct a performance test in accordance with 6.4.2 of this regulation, the surface tension measurement may fulfill this requirement;

6.8.5.2.4 For each monitored parameter for which a compliant value is to be established in 6.4.3 of this regulation, the specific operating parameter value, or range of values, that corresponds to compliance with the applicable emission limit;

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- 6.8.5.2.5 The methods that will be used to determine continuous compliance, including a description of monitoring and reporting requirements, if methods differ from those identified in 6.0 of this regulation;
- 6.8.5.2.6 A description of the air pollution control technique for each emission point;
- 6.8.5.2.7 A statement that the owner or operator has completed and has on file the operation and maintenance plan as required by the operation and maintenance procedures in 6.3.6 of this regulation;
- 6.8.5.2.8 If the owner or operator is determining facility size based on actual cumulative rectifier capacity in accordance with 6.3.3.3 of this regulation, records to support that the facility is small. For existing sources, records from any 12-month period preceding the compliance date shall be used or a description of how operations will change to meet a small designation shall be provided. For new sources, records of projected rectifier capacity for the first 12-month period of tank operation shall be used;
- 6.8.5.2.9 A statement by the owner or operator of the affected source as to whether the source has complied with the provisions of 6.0 of this regulation.
- 6.8.5.3 For sources required to conduct a performance test in 6.4.2 of this regulation, the notification of compliance status shall be submitted to the Department no later than 90 calendar days following completion of the compliance demonstration required by 6.4.2 and 3.7 of this regulation.
- 6.8.5.4 For sources that are not required to complete a performance test in accordance with 6.4.2 of this regulation, the notification of compliance status shall be submitted to the Department no later than 30 days after the compliance date specified in 6.4.1 of this regulation.
- 6.8.6 Reports of performance test results.
 - 6.8.6.1 If the State in which the source is located has not been delegated the authority to implement the rule, the owner or operator of an affected source shall report to the Administrator (with copy to the Department) the results of any performance test conducted as required by 6.4.2 and 3.7 of this regulation. If the State has been delegated the authority, the owner or operator of an affected source should report performance test results to the Department (with copy to the Administrator).
 - 6.8.6.2 Reports of performance test results shall be submitted no later than 90 days following the completion of the performance test, and shall be submitted as part of the notification of compliance status required in 6.8.5 of this regulation.
 - 6.8.6.3 Within 60 days after the date of completing each performance test (defined in 3.2 of this regulation) the owner or operator shall submit the results of the performance tests, including any associated fuel analyses, required by 6.0 of this regulation to the EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through the EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). Performance test data shall be submitted in the file format generated through use of the EPA's Electronic Reporting Tool (ERT) (see <http://www.epa.gov/ttn/chief/ert/index.html>). Only data collected using test methods on the ERT website are subject to this requirement for submitting reports electronically to WebFIRE. Owners or operators who claim that some of the information being submitted for performance tests is confidential business information (CBI) shall submit a complete ERT file including information claimed to be CBI on a compact disk, flash drive, or other commonly used electronic storage media to the EPA. The electronic media shall be clearly marked as CBI and mailed to U.S. EPA/OAQPS/CORE CBI Office, Attention: WebFIRE Administrator, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The same ERT file with the CBI omitted shall be submitted to the EPA via CDX as described earlier in 6.8.6.3 of this regulation. At the discretion of the Department, the owner or operator shall also submit these reports, including the confidential business information, to the Department in the format specified by the Department. For any performance test conducted using test methods that are not listed on the ERT website, the owner or operator shall submit the results of the performance test to the Administrator and the Department at the appropriate addresses listed in 3.13 of this regulation.
- 6.8.7 Ongoing compliance status reports for major sources.
 - 6.8.7.1 The owner or operator of an affected source that is located at a major source shall submit a summary report to the Department to document the ongoing compliance status of the affected source. The report shall contain the information identified in 6.8.7.3 of this regulation, and shall be submitted semiannually except when:
 - 6.8.7.1.1 The Department determines on a case-by-case basis that more frequent reporting is necessary to accurately assess the compliance status of the source or
 - 6.8.7.1.2 The monitoring data collected by the owner or operator of the affected source in accordance with 6.4.3 of this regulation show that the emission limitation has been exceeded, in which case quarterly reports shall be submitted. Once an owner or operator of an affected source reports an exceedance, ongoing compliance status reports shall be submitted quarterly until a request to reduce reporting frequency under 6.8.7.2 of this regulation is approved.
 - 6.8.7.2 Request to reduce frequency of ongoing compliance status reports.
 - 6.8.7.2.1 An owner or operator who is required to submit ongoing compliance status reports on a quarterly (or more frequent basis) may reduce the frequency of reporting to semiannual if all of the following conditions are met:
 - 6.8.7.2.1.1 For one full year (e.g., four quarterly or 12 monthly reporting periods), the ongoing compliance status reports demonstrate that the affected source is in compliance with the relevant emission limitation;
 - 6.8.7.2.1.2 The owner or operator continues to comply with all applicable recordkeeping and monitoring requirements of 6.0 and 3.0 of this regulation; and

- 6.8.7.2.1.3 The Department does not object to a reduced reporting frequency for the affected source, as provided in 6.8.7.2.2 and 6.8.7.2.3 of this regulation.
- 6.8.7.2.2 The frequency of submitting ongoing compliance status reports may be reduced only after the owner or operator notifies the Department in writing of his or her intention to make such a change, and the Department does not object to the intended change. In deciding whether to approve a reduced reporting frequency, the Department may review information concerning the source's entire previous performance history during the five-year recordkeeping period prior to the intended change, or the recordkeeping period since the source's compliance date, whichever is shorter. Records subject to review may include performance test results, monitoring data, and evaluations of an owner or operator's conformance with emission limitations and operation and maintenance procedures. Such information may be used by the Department to make a judgment about the source's potential for noncompliance in the future. If the Department disapproves the owner or operator's request to reduce reporting frequency, the Department will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Department to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.
- 6.8.7.2.3 As soon as the monitoring data required in 6.4.3 of this regulation show that the source is not in compliance with the relevant emission limitation, the frequency of reporting shall revert to quarterly, and the owner or operator shall state this exceedance in the ongoing compliance status report for the next reporting period. After demonstrating ongoing compliance with the relevant emission limitation for another full year, the owner or operator may again request approval from the Department to reduce the reporting frequency as allowed in 6.8.7.2 of this regulation.
- 6.8.7.3 Contents of ongoing compliance status reports. The owner or operator of an affected source for which compliance monitoring is required in accordance with 6.4.3 of this regulation shall prepare a summary report to document the ongoing compliance status of the source. The report shall contain the following information:
- 6.8.7.3.1 The company name and address of the affected source;
- 6.8.7.3.2 An identification of the operating parameter that is monitored for compliance determination, as required in 6.4.3 of this regulation;
- 6.8.7.3.3 The relevant emission limitation for the affected source, and the operating parameter value, or range of values, that correspond to compliance with this emission limitation as specified in the notification of compliance status required in 6.8.5 of this regulation;
- 6.8.7.3.4 The beginning and ending dates of the reporting period;
- 6.8.7.3.5 A description of the type of process performed in the affected source;
- 6.8.7.3.6 The total operating time of the affected source during the reporting period;
- 6.8.7.3.7 If the affected source is a hard chromium electroplating tank and the owner or operator is limiting the maximum cumulative rectifier capacity in accordance with 6.3.3.3 of this regulation, the actual cumulative rectifier capacity expended during the reporting period, on a month-by-month basis;
- 6.8.7.3.8 A summary of operating parameter values, including the total duration of excess emissions during the reporting period as indicated by those values, the total duration of excess emissions expressed as a percent of the total source operating time during that reporting period, and a breakdown of the total duration of excess emissions during the reporting period into those that are due to process upsets, control equipment malfunctions, other known causes, and unknown causes;
- 6.8.7.3.9 The number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded. The report shall also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with 6.3.1.2 of this regulation, including actions taken to correct a malfunction;
- 6.8.7.3.10 A certification by a responsible official, as defined in 3.2 of this regulation, that the operation and maintenance procedures in 6.3.6 of this regulation were followed in accordance with the operation and maintenance plan for the source;
- 6.8.7.3.11 If the operation and maintenance plan required in 6.3.6.3 of this regulation was not followed, an explanation of the reasons for not following the provisions, an assessment of whether any excess emission or parameter monitoring exceedances are believed to have occurred, and a copy of the report or reports required in 6.3.6.3.4 of this regulation documenting that the operation and maintenance plan was not followed;
- 6.8.7.3.12 A description of any changes in monitoring, processes, or controls since the last reporting period;
- 6.8.7.3.13 The name, title, and signature of the responsible official who is certifying the accuracy of the report; and
- 6.8.7.3.14 The date of the report.
- 6.8.7.4 When more than one monitoring device is used to comply with the continuous compliance monitoring required in 6.4.3 of this regulation, the owner or operator shall report the results as required for each monitoring device. However, when one monitoring device is used as a backup for the primary monitoring device, the owner or operator shall only report the results from the monitoring device used to meet the monitoring requirements of 6.0 of this regulation. If both devices are used to meet these requirements, then the owner or operator shall report the results from each monitoring device for the relevant compliance period.
- 6.8.8 Ongoing compliance status reports for area sources. The requirements in 6.8.8 of this regulation do not alleviate affected area sources from complying with the requirements of 7 DE Admin. Code 1102 of the State of Delaware "Regulations Governing the Control of Air Pollution".

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- 6.8.8.1 The owner or operator of an affected source that is located at an area source shall prepare a summary report to document the ongoing compliance status of the affected source. The report shall contain the information identified in 6.8.7.3 of this regulation, shall be completed and retained on site, and shall be made available to the Department upon request. The report shall be completed annually except as provided in 6.8.8.2 of this regulation.
- 6.8.8.2 Reports of exceedances.
- 6.8.8.2.1 If either of the following conditions is met, semiannual reports shall be prepared and submitted to the Department:
- 6.8.8.2.1.1 The total duration of excess emissions (as indicated by the monitoring data collected by the owner or operator of the affected source in accordance with 6.4.3 of this regulation) is 1% or greater of the total operating time for the reporting period or
- 6.8.8.2.1.2 The total duration of malfunctions of the add-on air pollution control device and monitoring equipment is 5% or greater of the total operating time.
- 6.8.8.2.2 Once an owner or operator of an affected source reports an exceedance as defined in 6.8.8.2.1 of this regulation, ongoing compliance status reports shall be submitted semiannually until a request to reduce reporting frequency under 6.8.8.3 of this regulation is approved.
- 6.8.8.2.3 The Department may determine on a case-by-case basis that the summary report shall be completed more frequently and submitted, or that the annual report shall be submitted instead of being retained on site, if these measures are necessary to accurately assess the compliance status of the source.
- 6.8.8.3 Request to reduce frequency of ongoing compliance status reports.
- 6.8.8.3.1 An owner or operator who is required to submit ongoing compliance status reports on a semiannual (or more frequent) basis, or is required to submit its annual report instead of retaining it on site, may reduce the frequency of reporting to annual or be allowed to maintain the annual report onsite if all of the following conditions are met:
- 6.8.8.3.1.1 For one full year (e.g., two semiannual or four quarterly reporting periods), the ongoing compliance status reports demonstrate that the affected source is in compliance with the relevant emission limitation;
- 6.8.8.3.1.2 The owner or operator continues to comply with all applicable recordkeeping and monitoring requirements of 6.0 and 3.0 of this regulation; and
- 6.8.8.3.1.3 The Department does not object to a reduced reporting frequency for the affected source, as provided in 6.8.8.3.2 and 6.8.8.3.3 of this regulation.
- 6.8.8.3.2 The frequency of submitting ongoing compliance status reports may be reduced only after the owner or operator notifies the Department in writing of his or her intention to make such a change, and the Department does not object to the intended change. In deciding whether to approve a reduced reporting frequency, the Department may review information concerning the source's previous performance history during the five-year recordkeeping period prior to the intended change, or the recordkeeping period since the source's compliance date, whichever is shorter. Records subject to review may include performance test results, monitoring data, and evaluations of an owner or operator's conformance with emission limitations and operation and maintenance procedures. Such information may be used by the Department to make a judgment about the source's potential for noncompliance in the future. If the Department disapproves the owner or operator's request to reduce reporting frequency, the Department will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Department to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.
- 6.8.8.3.3 As soon as the monitoring data required in 6.4.3 of this regulation show that the source is not in compliance with the relevant emission limitation, the frequency of reporting shall revert to semiannual, and the owner or operator shall state this exceedance in the ongoing compliance status report for the next reporting period. After demonstrating ongoing compliance with the relevant emission limitation for another full year, the owner or operator may again request approval from the Department to reduce the reporting frequency as allowed in 6.8.8.3 of this regulation.
- 6.8.9 Reports associated with trivalent chromium baths. The requirements in 6.8.9 of this regulation do not alleviate affected sources from complying with the requirements of 7 DE Admin. Code 1102 and 1130 of the State of Delaware "Regulations Governing the Control of Air Pollution". Owners or operators complying with the provisions in 6.3.5 of this regulation are not subject to 6.8.1 through 6.8.8 of this regulation, but shall instead submit the following reports:
- 6.8.9.1 No later than September 11, 1999, submit an initial notification that includes:
- 6.8.9.1.1 The same information as is required in 6.8.3.1.1 through 6.8.3.1.5 of this regulation;
- 6.8.9.1.2 A statement that a trivalent chromium process that incorporates a wetting agent will be used to comply with 6.3.5 of this regulation; and
- 6.8.9.1.3 The list of bath components that comprise the trivalent chromium bath, with the wetting agent clearly identified.

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- 6.8.9.2 Within 30 days of the compliance date specified in 6.4.1 of this regulation or by September 11, 1999, whichever is later, a notification of compliance status that contains an update of the information submitted in accordance with 6.8.9.1 of this regulation or a statement that the information is still accurate.
- 6.8.9.3 Within 30 days of a change to the trivalent chromium electroplating process, a report that includes:
- 6.8.9.3.1 A description of the manner in which the process has been changed and the emission limitation, if any, now applicable to the affected source;
 - 6.8.9.3.2 If a different emission limitation applies, the applicable information required in 6.8.3.1 of this regulation; and
 - 6.8.9.3.3 The notification and reporting requirements in 6.8.4 through 6.8.8 of this regulation, which shall be submitted in accordance with the schedules identified in those requirements.
- 6.9 [Reserved]

Table 6-3 - Applicability of 3.0 to 6.0 of this regulation

General Provisions Reference	Applies to 6.0	Comments
3.1.1.1	Yes	Additional terms defined in 6.2 of this regulation; when overlap between 6.2 and 3.2 of this regulation occurs, 6.2 takes precedence.
3.1.1.2	Yes	
3.1.1.3	Yes	
3.1.1.4	Yes	6.0 of this regulation clarifies the applicability of each provision in 3.0 of this regulation to sources subject to 6.0.
3.1.1.5	No	Reserved.
3.1.1.6	Yes	
3.1.1.7	No	Reserved.
3.1.1.8	No	Reserved.
3.1.1.9	No	Reserved.
3.1.1.10	Yes	
3.1.1.11	Yes	6.8.1 of this regulation also allows report submissions via fax and on electronic media.
3.1.1.12	Yes	
3.1.2.1	No	6.1 of this regulation specifies applicability.
3.1.2.2	No	Reserved.
3.1.2.3	No	This provision in 3.0 of this regulation is being deleted. Also, all affected area and major sources are subject to 6.0 of this regulation; there are no exemptions.
3.1.3.1	Yes	6.0 of this regulation clarifies the applicability of each provision in 3.0 of this regulation to sources subject to 6.0.
3.1.3.2	Yes	6.1.5 of this regulation exempts area sources from the obligation to obtain Title V operating permits.
3.1.3.3-3.1.3.4	No	Reserved.
3.1.3.5	No	6.0 of this regulation clarifies that an area source that becomes a major source is subject to the requirements for major sources.
3.1.4	No	Reserved.
3.1.5	Yes	
3.2	Yes	Additional terms defined in 6.2 of this regulation; when overlap between 6.2 and 3.2 of this regulation occurs, 6.2 takes precedence.
3.3	Yes	Other units used in 6.0 of this regulation are defined in 6.0.
3.4.1.1-3.4.1.2	Yes	
3.4.1.3-3.4.1.5	No	Reserved.
3.4.2-3.4.3	Yes	
3.5.1	Yes	Except replace the term "source" and "stationary source" in 3.5.1.1 and 3.5.1.2 of this regulation with "affected sources."
3.5.2.1	Yes	
3.5.2.2	No	Reserved.
3.5.2.3	Yes	Applies only to major affected sources.
3.5.2.4	No	6.6 of this regulation specifies requirements for the notification of construction or reconstruction for affected sources that are not major sources.
3.5.2.5	No	Reserved.
3.5.2.6	Yes	
3.5.3	No	Reserved.
3.5.4.1.1	No	6.6.2.5 of this regulation specifies when the application or notification shall be submitted.
3.5.4.1.2-3.5.4.1.2.6	Yes	Applies to major affected sources that are new or reconstructed.
3.5.4.1.2.7	No	Reserved.
3.5.4.1.2.8	Yes	
3.5.4.1.2.9	No	Reserved.
3.5.4.1.2.10	Yes	

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3.5.4.1.3	Yes	Except information should be submitted with the notification of compliance status required in 6.8.5 of this regulation.
3.5.4.2	Yes	Applies to major affected sources that are new or reconstructed except: (1) replace "source" in 3.5.4.2 of this regulation with "affected source"; and (2) actual control efficiencies are submitted with the notification of compliance status required in 6.8.5 of this regulation.
3.5.4.3-3.5.4.4	Yes	Applies to major affected sources that are new or reconstructed.
3.5.5	Yes	Applies to major affected sources that are new or reconstructed.
3.5.6.1	Yes	Except replace "source" in 3.5.6.1 of this regulation with "affected source."
3.5.6.2	No	New or reconstructed affected sources shall submit the request for approval of construction or reconstruction under 3.5.6 of this regulation by the deadline specified in 6.6.2.5 of this regulation.
3.6.1	Yes	
3.6.2.1-3.6.2.2	Yes	Except replace "source" in 3.6.2.1 and 3.6.2.2 of this regulation with "affected source."
3.6.2.3-3.6.2.4	Yes	
3.6.2.5	Yes	Except replace "source" in 3.6.2.5 of this regulation with "affected source."
3.6.2.6	No	Reserved.
3.6.2.7	No	Provisions for new area sources that become major sources are contained in 6.4.1.4 of this regulation.
3.6.3.1-3.6.3.2	Yes	Except replace "source" in 3.6.3.1 and 3.6.3.2 of this regulation with "affected source."
3.6.3.3-3.6.3.4	No	Reserved.
3.6.3.5	No	Compliance provisions for existing area sources that become major sources are contained in 6.4.1.3 of this regulation.
3.6.4	No	Reserved.
3.6.5	No	6.3.6 of this regulation contains work practice standards (operation and maintenance requirements) that override these provisions.
3.6.6.1	No	6.3.2 of this regulation specifies when the standards apply.
3.6.6.2.1-3.6.6.2.2	Yes	
3.6.6.2.3	No	6.5.2 of this regulation specifies instances in which previous performance test results for existing sources are acceptable.
3.6.6.2.4	Yes	
3.6.6.2.5	Yes	
3.6.6.3	Yes	
3.6.7	Yes	
3.6.8	No	6.0 of this regulation does not contain any opacity or visible emission standards.
3.6.9.1	Yes	
3.6.9.2	Yes	Except replace "source" in 3.6.9.2.1 and 3.6.9.2.2 of this regulation with "affected source".
3.6.9.3	Yes	
3.6.9.4.1	No	6.4.1.6 of this regulation specifies the procedures for obtaining an extension of compliance and the date by which such requests shall be submitted.
3.6.9.4.2	Yes	
3.6.9.5	Yes	
3.6.9.6.1	Yes	This paragraph only references "3.6.9.4 of this regulation" for compliance extension provisions. But, 6.4.1.6 of this regulation also contains provisions for requesting a compliance extension.
3.6.9.6.2	Yes	
3.6.9.7	Yes	
3.6.9.8	Yes	This paragraph only references "3.6.9.4 through 3.6.9.6 of this regulation" for compliance extension provisions. But, 6.4.1.6 of this regulation also contains provisions for requesting a compliance extension.
3.6.9.9	Yes	This paragraph only references "3.6.9.4 through 3.6.9.6 of this regulation" and "3.6.9.4 and 3.6.9.5 of this regulation" for compliance extension provisions. But, 6.4.1.6 of this regulation also contains provisions for requesting a compliance extension.
3.6.9.10.1-3.6.9.10.4	Yes	
3.6.9.10.5.1	Yes	This paragraph only references "3.6.9.4 of this regulation" for compliance extension provisions. But, 6.4.1.6 of this regulation also contains provisions for requesting a compliance extension.
3.6.9.10.5.2	Yes	
3.6.9.11	Yes	
3.6.9.12.1	Yes	This paragraph only references "3.6.9.4.1 or 3.6.9.5 of this regulation" for compliance extension provisions. But, 6.4.1.6 of this regulation also contains provisions for requesting a compliance extension.
3.6.9.12.2-3.6.9.12.4	Yes	
3.6.9.13	Yes	
3.6.9.14	Yes	
3.6.9.15	No	Reserved.
3.6.9.16	Yes	

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3.6.10	Yes	
3.7.1.1-3.7.1.2	Yes	
3.7.1.2.1-2.7.1.2.8	No	Reserved.
3.7.1.2.9	Yes	
3.7.1.3	Yes	
3.7.2.1	No	6.8.4 of this regulation requires notification prior to the performance test. 6.5.1 of this regulation requires submission of a site-specific test plan upon request.
3.7.2.2	Yes	
3.7.3	No	6.5.1 of this regulation specifies what the test plan should contain, but does not require test plan approval or performance audit samples.
3.7.4	Yes	Except replace "source" in the first sentence of 3.7.4 of this regulation with "affected source."
3.7.5.1	No	See 6.5.1 of this regulation. Any cross reference to 3.7.5.1 of this regulation in any other general provision incorporated by reference shall be treated as a cross-reference to 6.5.1.
3.7.5.2-3.7.5.4	Yes	6.0 of this regulation also contains test methods specific to affected sources covered by 6.0.
3.7.6	Yes	6.5.3.2 of this regulation identifies CARB Method 425 as acceptable under certain conditions.
3.7.7.1	No	6.0 of this regulation identifies the items to be reported in the compliance test [6.5.1 of this regulation] and the timeframe for submitting the results [6.8.6 of this regulation].
3.7.7.2	No	Reserved.
3.7.7.3	Yes	
3.7.8.1-3.7.8.2	Yes	
3.7.8.3.1	Yes	This paragraph only references "3.6.9" for compliance extension provisions. But, 6.4.1.6 of this regulation also contains provisions for requesting a compliance extension.
3.7.8.3.2-3.7.8.3.3	Yes	
3.7.8.4-3.7.8.5	Yes	
3.8.1.1	Yes	
3.8.1.2	No	Work practice standards are contained in 6.3.6 of this regulation.
3.8.1.3	No	Reserved.
3.8.1.4	No	
3.8.2.1	Yes	
3.8.2.2	No	6.5.4 of this regulation specifies the monitoring location when there are multiple sources.
3.8.2.3	No	6.8.7.4 of this regulation identifies reporting requirements when multiple monitors are used.
3.8.3.1.1	No	6.0 of this regulation requires proper maintenance of monitoring devices expected to be used by sources subject to 6.0.
3.8.3.1.2	No	6.3.6.3.4 of this regulation specifies reporting when the O&M plan is not followed.
3.8.3.1.3	No	6.3.6.2 of this regulation identifies the criteria for whether O&M procedures are acceptable.
3.8.3.2-3.8.3.3	No	6.5.4.2 of this regulation requires appropriate use of monitoring devices.
3.8.3.4-3.8.3.8	No	
3.8.4	No	Maintenance of monitoring devices is required in 6.3.6 and 6.5.4.2 of this regulation.
3.8.5	No	There are no performance evaluation procedures for the monitoring devices expected to be used to comply with 6.0 of this regulation.
3.8.6.1	Yes	
3.8.6.2	No	Instances in which the Administrator may approve alternatives to the monitoring methods and procedures of 6.0 of this regulation are contained in 6.4.3.8 of this regulation.
3.8.6.3	Yes	
3.8.6.4	Yes	
3.8.6.5	Yes	
3.8.6.6	No	6.0 of this regulation does not require the use of CEM's.
3.8.7	No	Monitoring data does not need to be reduced for reporting purposes because 6.0 of this regulation requires measurement once/day.
3.9.1	Yes	
3.9.2.1.1-3.9.2.1.2	No	6.4.1.3 requires area sources to comply with major source provisions if an increase in HAP emissions causes them to become major sources.
3.9.2.1.3	No	6.8.3.2 of this regulation specifies initial notification requirements for new or reconstructed affected sources.
3.9.2.2	No	6.8.3.1 of this regulation specifies the information to be contained in the initial notification.
3.9.2.3	No	6.8.3.2 of this regulation specifies notification requirements for new or reconstructed sources that are not major affected sources.
3.9.2.4	No	
3.9.2.5	No	

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3.9.3	Yes	This paragraph only references "3.6.9.4 through 3.6.9.6" for compliance extension provisions. But, 6.4.1.6 of this regulation also contains provisions for requesting a compliance extension. 6.0 of this regulation provides a different timeframe for submitting the request than 3.6.9.4 of this regulation.
3.9.4	Yes	This paragraph only references "the notification dates established in 3.9.7 of this regulation". But, 6.8 of this regulation also contains notification dates.
3.9.5	No	Notification of performance test is required in 6.8.4 of this regulation.
3.9.6	No	
3.9.7	No	6.0 of this regulation does not require a performance evaluation or relative accuracy test for monitoring devices.
3.9.8.1-3.9.8.3	No	6.8.5 of this regulation specifies information to be contained in the notification of compliance status and the timeframe for submitting this information.
3.9.8.4	No	Reserved.
3.9.8.5	No	Similar language has been incorporated into 6.8.5.2.3 of this regulation.
3.9.8.6	Yes	
3.9.9	Yes	
3.9.10	Yes	
3.10.1	Yes	
3.10.2.1	Yes	
3.10.2.2	No	6.7.2 of this regulation specifies the records that shall be maintained.
3.10.2.3	No	6.0 of this regulation applies to major and area sources.
3.10.3	No	Applicable requirements of 3.10.3 of this regulation have been incorporated into 6.7.2 of this regulation.
3.10.4.1	Yes	
3.10.4.2	No	6.8.6 of this regulation specifies the timeframe for reporting performance test results.
3.10.4.3	No	6.0 of this regulation does not contain opacity or visible emissions standards.
3.10.4.4	Yes	
3.10.4.5	No	6.3.6.3.4 and 6.8.7.3 of this regulation specify reporting associated with malfunctions.
3.10.5	No	6.8.7 and 6.8.8 of this regulation specify the frequency of periodic reports of monitoring data used to establish compliance. Applicable requirements of 3.10.5 of this regulation have been incorporated into 6.8.7 and 6.8.8.
3.10.6	Yes	
3.11	No	Flares will not be used to comply with the emission limitations.
3.12-3.15	Yes	

11 DE Reg. 683 (11/01/07)

17 DE Reg. 328 (09/01/13)

METHOD 205.1

DETERMINATION OF HEXAVALENT CHROMIUM AND TOTAL CHROMIUM
EMISSIONS FROM CHROME PLATING AND ANODIZING EQUIPMENT
USING A WET IMPINGEMENT TRAIN

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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METHOD 205.1

DETERMINATION OF HEXAVALENT CHROMIUM AND TOTAL CHROMIUM
EMISSIONS FROM CHROME PLATING AND ANODIZING EQUIPMENT USING
A WET IMPINGEMENT TRAIN

OFFICE OF OPERATIONS
APPLIED SCIENCE AND TECHNOLOGY DIVISION
AUGUST 1991

3. Laboratory Procedures

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METHOD 205.1

DETERMINATION OF HEXAVALENT CHROMIUM AND TOTAL CHROMIUM EMISSIONS FROM CHROME PLATING AND ANODIZING EQUIPMENT USING A WET IMPINGEMENT TRAIN

Section 1 of 4

1. Overview

1.1 Principle

A sample of stack gases is withdrawn isokinetically from the source through a wet impingement train. The chromium aerosol is collected in impingers containing 0.02N NaHCO₃ solution, and also by a backup Teflon filter. Aliquots of the collected sample are analyzed for hexavalent chromium and the remainder is digested and analyzed for total chromium.

The hexavalent chromium analysis is performed with a visible range spectrophotometer by the diphenylcarbazide (DPC) method. If the absorbance measured for any sample by the DPC method is less than 0.010, then use the ion chromatography (IC) method. (The hexavalent chromium concentration which corresponds to this

205.1-1

Application of this method may be extended and variations may be used with the approval of the Executive Officer.

1.3 Range and Precision

1.3.1 Hexavalent Chromium by DPC Method

The response curve is a straight line in the 10 to 200 ng/mL range of hexavalent chromium. A minimum detection limit of 10 ng/mL has been observed. For a minimum analytical accuracy of ± 10 percent, the lower limit of the range is approximately 20 ng/mL. The upper limit can be extended by appropriate dilution.

1.3.2 Hexavalent Chromium by IC Method

A straight line response curve can be obtained in the 5 to 50 ng/mL range of hexavalent chromium. With direct injection of 250 μ L, the minimum detection limit is approximately 1 ng/mL. Preconcentration of a larger sample will lower the detection limit correspondingly. A quantifiable limit of 6 pg/mL using

205.1-3

absorbance level will vary with different spectrophotometers, but is approximately 0.01 ppm with a Perkin-Elmer Model 552A with a one-centimeter solution path length.)

The remainder of the sample is prepared for total chromium analysis by an acid digestion procedure. The total chromium analysis is performed with an atomic absorption spectrophotometer (AAS) in the flame mode, using a nitrous oxide-acetylene flame. If the absorbance measured for any sample by this flame-AAS method, at an absorption wavelength of 357.9 nm, is less than 0.100, then use the furnace-AAS method. (The total chromium concentration which corresponds to this absorbance level will vary with different spectrophotometers, but is approximately 0.1 ppm with a Varian SpectrAA-40 burning with a rich red flame.)

1.2 Applicability

This method is used to determine total chromium and hexavalent chromium (Cr⁶⁺) emissions from chrome plating and anodizing operations. See Interferences for the method limitations.

205.1-2

preconcentration of a 20 mL aliquot has been reported.

1.3.3 Total Chromium by Flame-AAS Method

Using the most sensitive wavelength for chromium of 357.9 nm, the working range is 0.1 to 50 μ g/mL of chromium. Using less sensitive wavelengths, e.g. 425.4 nm, 428.9 nm, 520.8 nm, and 520.4 nm, direct measurements without dilutions may be made for much higher concentrations of chromium. The optimum working range for each of these wavelengths has not been determined for the nitrous oxide-acetylene flame, but is expected to extend as high as 6000 ppm chromium for the least sensitive wavelength.

1.3.4 Total Chromium by Furnace-AAS Method

The analytical working range is 1 to 20 ng/mL, using 20 μ L injections in an argon atmosphere.

205.1-4

1.4 Interferences

1.4.1 Interferences for Hexavalent Chromium by DPC Method

Molybdenum, mercury, and vanadium react with diphenylcarbazide to form a color. However, approximately 200 µg/mL of these elements can be present in a sample without creating a problem. Iron produces a yellow color, but this effect is not measured photometrically at 540 nm.

1.4.2 Interferences for Hexavalent Chromium by IC Method

Trivalent chromium is separated during the chromatography step, and will not interfere. Fe (III) produces a negative interference when it is present in concentrations greater than approximately 500 µg/mL.

1.4.3 Interferences for Total Chromium by Flame-AAS Method

Low concentrations of calcium may cause interferences. At concentrations above 200 µg/mL the effect is constant. Calcium nitrate may be added to ensure a known constant effect (optional).

1.4.5 Special Considerations

Since SO₂ reacts with Cr⁶⁺ on an approximately equimolar basis and converts it to Cr³⁺, flue gases that contain SO₂ can create a substantial negative interference. The magnitude of the interference depends on their relative concentrations.

Hexavalent chromium may be lost due to reactions with organics or other oxidizable materials, or gained by use of contaminated equipment or reagents. Improper sample storage may lead to changes in sample concentrations. Because of these considerations, it is necessary to scrupulously clean all equipment, and follow all instructions on reagent purity and sample stabilization and storage, as described in this method. For the same

No interferences are expected when a nitrous oxide-acetylene flame is used instead of an air-acetylene flame.

1.4.4 Interferences for Total Chromium by Furnace-AAS Method

The long residence time and high concentrations of the atomized sample in the optical path of the graphite furnace can result in severe physical and chemical interferences.

Furnace parameters should be optimized to minimize these effects. If the analyte is not completely volatilized and removed from the furnace during atomization, memory effects will occur. If this situation is detected, clean the tube by operating the furnace at higher atomization temperatures.

Do not use nitrogen as the purge gas to eliminate the possibility of cyanogen band interference.

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205.1-6

205.1-7

205.1-8

METHOD 205.1

DETERMINATION OF HEXAVALENT CHROMIUM AND TOTAL CHROMIUM EMISSIONS FROM CHROME PLATING AND ANODIZING EQUIPMENT USING A WET IMPINGEMENT TRAIN

Section 2 of 4

2. Field Procedure

2.1 Sampling Apparatus

2.1.1 Sampling Train

A schematic of the sampling train used in this method is shown in Figure 205.1-1.

a. Probe Nozzle

The nozzle material shall be glass or quartz with a sharp, tapered leading edge. The taper angle shall be $\leq 30^\circ$ and on the outside, to preserve a constant internal diameter. A range of nozzle sizes suitable for isokinetic sampling should be available in increments of

205.1-9

Method 2.1, for stack velocity head readings, and a separate manometer for orifice differential pressure readings.

e. Impinger Train

The train consists of four Greenburg-Smith design impingers connected in series with ground-glass fittings, or any similar leak-free non-contaminating fittings. The first and second impingers must be of the Greenburg-Smith design with the standard tip. The third and fourth impingers must be of the Greenburg-Smith design, modified by replacing the tip with a 1.3 cm (1/2 in.) ID glass tube extending to about 1.3 cm (1/2 in.) from the bottom of the flask. The first and second impingers contain 100 mL of 0.02N NaHCO₃. The third is empty, and the fourth contains a known weight of 6 to 16 mesh indicating-type silica gel or equivalent. Place a thermometer capable of measuring temperature to

205.1-11

0.16 cm (1/16 in.), e.g. from 0.32 to 1.27 cm (1/8 to 1/2 in.) or larger if higher volume trains are used.

Each nozzle must be calibrated before its use. (See Method 5.1, Section 2.1.1 a.)

b. Probe Liner

Use borosilicate or quartz probe liners.

c. Pitot Tube

Use an S-type Pitot tube, as described in Section 1.1 of Method 2.1. Attach the Pitot tube to the probe as shown in Figure 205.1-1 for monitoring the stack gas velocity. Refer to Method 2.1 for the specifications of the assembly.

d. Differential Pressure Gauge

Use an inclined manometer or equivalent device, as described in

205.1-10

within 1°C (2°F) at the outlet of the fourth impinger to monitor outlet gas temperature.

Instead of using silica gel the moisture leaving the third impinger may be determined by monitoring the temperature and pressure at the exit of the impinger train and then applying Dalton's law of partial pressures.

f. Filter Holder

Use a borosilicate glass filter holder, with a glass frit, Teflon, or stainless steel filter support. If a stainless steel filter support is used, protect the Teflon filter from the filter support by placing a glass fiber filter between the two.

g. Metering System

The metering system includes vacuum gauge, leak-free pump, thermometer capable of measuring temperature to

205.1-12

within 3°C (5.4°F), dry gas meter capable of measuring volume to within 2 percent, and related equipment, as shown in Figure 205.1-1. An alternative to the thermometer and dry gas meter is an equivalent temperature-compensated dry gas meter. When the metering system is used in conjunction with a Pitot tube, the system should allow for checks of isokinetic rates.

2.1.2 Temperature Determination Equipment

Use the temperature sensor described in Method 2.1. Preferably, the temperature sensor should be permanently attached to the Pitot tube or sampling probe so that the tip of the sensor extends beyond the leading edge of the probe sheath and does not touch metal.

2.1.3 Barometer

A mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm (0.1 in.) Hg is used.

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b. Filters

Teflon filters, 0.3 micron.
Glass fiber filters are needed when stainless steel filter supports are used.

c. Silica Gel

Indicating-type silica gel, 6 to 16 mesh.
Use new silica gel as received. If previously used, dry at 175°C (350°F) for 2 hours. Other types of desiccants may be used subject to the approval of the Executive Officer.

d. Water

e. Crushed ice or dry ice pellets.

2.3 Pretest Determination

Select the sampling site and the minimum number of sampling points according to Method 1.1. Determine the static pressure, temperature, and

205.1-15

The barometric pressure may be obtained from a nearby National Weather Service (NWS) station. Request the station value (which is the absolute barometric pressure) and adjust for elevation difference between the NWS station and the sampling point at the rate of minus 2.5 mm (0.1 in.) Hg per 30 m (100 ft) elevation increase or plus the same adjustment for elevation decrease.

2.1.4 Gas Molecular Weight-Determination Equipment

Same as Method 3.1. Concurrent determination is not required when the process is steady state and molecular weight varies less than 2 percent.

2.2 Sampling Reagents

a. 0.02N NaHCO₃ Solution (Nominal)

See Section 3.2.1 d for preparation.

205.1-14

the range of velocity heads using Method 2.1. Perform leak check of the Pitot lines (see Method 2.1).

With glass liners, install the selected nozzle using a Viton A O-ring. Other connecting systems using Teflon ferrules may be used. The use of one piece glass probe with nozzle will avoid the possibility of leaks. Mark the probe with heat resistant tape to denote the proper distance into the stack or duct for each sampling point.

Set up the train as in Figure 205.1-1. Do not use grease on the ground-glass joints, or anywhere else in the sampling apparatus upstream of the filter, to preclude the possibility of contamination of the sample by the grease.

Place crushed ice or water and dry ice around the impingers.

Determine the moisture content of the stack gas using Method 4.1 or its alternative to make sampling rate settings. Determine the stack gas dry molecular weight as described in Method 2.1. In most of the cases, the dry molecular weight of

205.1-16

the effluent gases from chromium plating operations may be assumed to be 28.95. Select a nozzle size based on the range of velocity heads encountered, so that it is not necessary to change the nozzle to maintain isokinetic sampling rates. During the run, do not change the nozzle. Choose the proper differential pressure gauge for the range of velocity heads encountered (see Method 2.2).

Select a probe length suitable for sampling all traverse points. For large stacks, consider sampling from opposite sides of the stack (four sampling ports) to reduce probe length.

The total sample volume (corrected to standard conditions) must not be less than 180 cubic feet. The sampling time at each traverse point must be an integer or an integer plus one-half minute. The sampling time should be the same at each point.

2.4 Gas Volume Meter Check

See Method 5.1, Section 2.4.

2.5 Leak Checks

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Follow the procedure as described in Method 5.1, Section 2.5.

2.6 Sampling Train Operation

Follow the procedure as described in Method 5.1, Section 2.6.

2.7 Calculation of Percent Isokinetic Flow

Calculate percent isokinetic flow using the equation shown in Method 5.1, Figure 5.1-6, to determine whether the run was valid or another test run should be made.

2.8 Sample Handling

Follow the procedure as described in Method 5.1, Section 2.8.

2.9 Calibration

See Chapter III.

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METHOD 205.1

DETERMINATION OF HEXAVALENT CHROMIUM AND TOTAL CHROMIUM EMISSIONS FROM CHROME PLATING AND ANODIZING EQUIPMENT USING A WET IMPINGEMENT TRAIN

Section 3 of 4

3. Laboratory Procedures

3.1 Apparatus

3.1.1 Sampling Train

A schematic of the sampling train is shown in Figure 205.1-1.

See description in Section 2.1.

3.1.2 Sample Recovery

a. Wash Bottles

Polyethylene.

b. Balance

To measure to 0.5 g.

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c. Sample Containers

Leak-free linear polyethylene bottles (LPE).

d. Funnel

Glass, to aid in sample recovery.

e. pH Meter

Capable of accurately measuring pH to 0.02.

3.1.3 Analysis

3.1.3.1 Apparatus for Hexavalent Chromium by DPC Method

a. Volumetric Flasks

A 50 mL volumetric flask for each sample, spike, blank, and standard; and one 100 mL and three 1000 mL flasks for reagent preparation.

205.1-20

<p>b. Pipets</p> <p>Assorted sizes, as needed.</p>	<p>d. Dionex* Reagent Delivery Module (RDM)</p> <p>P/N 35354, (or equivalent).</p>
<p>c. Spectrophotometer</p> <p>Double beam, visible range, capable of measuring absorbance at 540 nm.</p>	<p>e. Dionex* Membrane Reactor</p> <p>P/N 35354, (or equivalent).</p>
<p>3.1.3.2 Apparatus for Hexavalent Chromium by IC Method</p>	<p>f. Dionex* Visible Detector (VSM)</p> <p>P/N 37044, (or equivalent).</p>
<p>a. Dionex* Single Channel Ion Chromatograph</p> <p>P/N 37029 (or equivalent).</p>	<p>g. Preconcentration Column</p> <p>CG-5 (or equivalent).</p>
<p>b. Dionex* HPIC-CG5 Cation Guard Column</p> <p>P/N 37028, (or equivalent).</p>	<p>h. pH Meter</p> <p>See Section 3.1.2 e.</p>
<p>c. Dionex* HPIC-CS5 Cation Separator Column</p> <p>P/N 37030, (or equivalent).</p>	<p>*Dionex is the trade name of an ion chromatograph manufactured by Dionex Corp. No endorsement of the company or its products is implied or intended.</p>
<p>205.1-21</p>	<p>205.1-22</p>
<p>3.1.3.3 Apparatus for Digestion for Atomic Absorption Analysis</p>	<p>Single or dual channel, single-or double-beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, a wavelength range of 190 to 800 nm and provision for simultaneous background correction.</p>
<p>a. Beakers</p> <p>600 mL</p>	<p>b. Chromium Hollow Cathode Lamp or Electrodeless Discharge Lamp</p>
<p>b. Filtration Apparatus</p> <p>Consisting of all plastic and glass suction flask and filter holder.</p>	<p>c. Electric Heater for Nitrous Oxide Supply Line</p>
<p>c. Volumetric Flasks</p> <p>50 mL</p>	<p>d. Burner Suitable for Nitrous Oxide Acetylene Flame</p>
<p>d. Linear Polyethylene Bottles (LPE)</p> <p>100 mL</p>	<p>3.1.3.5 Apparatus for Total Chromium by Furnace-AAS Method</p>
<p>3.1.3.4 Apparatus for Total Chromium by Flame-AAS Method</p>	<p>a. Atomic Absorption Spectrophotometer</p>
<p>a. Atomic Absorption Spectrophotometer</p>	
<p>205.1-23</p>	<p>205.1-24</p>

Single or dual channel, single-or double-beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, a wavelength range of 190 to 800 nm and provisions for simultaneous background correction and interfacing with a strip chart recorder.

b. Chromium Hollow Cathode Lamp or Electrodeless Discharge Lamp

c. Graphite Furnace

Any graphite furnace device with the appropriate temperature and timing controls.

d. Strip Chart Recorder

A recorder is strongly recommended for furnace work so that there will be a

205.1-25

carbon adsorption, and a UV light for sterilization. Reference to water throughout this method implies water as defined here unless expressly redefined.

b. Nitric Acid (HNO₃), Concentrated, Low Trace Metals

All subsequent references to HNO₃ mean low trace metal grade unless expressly redefined.

c. Nitric Acid (HNO₃), 1:1

Prepare by carefully adding one liter of concentrated HNO₃ in small increments to one liter of water while mixing.

d. Sodium Bicarbonate (NaHCO₃), 0.02N (Nominal)

Dilute 2 g of ultrapure NaHCO₃ to one liter with water.

205.1-27

permanent record and so that any problems with the analysis such as drift, incomplete atomization, losses during charring, changes in sensitivity, etc., can easily be recognized.

3.2 Reagents

Unless otherwise indicated, all reagents must conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society. Where such specifications are not available, use the best available grade.

3.2.1 Reagents for Pretest Preparation and Sample Collection

a. Water

Water must meet ASTM Type I specifications or better, except that distilled water is not necessary as a feedstock. Where distilled water is not used, the deionizing system must also contain particulate filters,

205.1-26

e. Silica Gel

See Section 2.2.6.

3.2.2 Reagents for Sample Recovery

a. Sodium Bicarbonate (NaHCO₃), 0.02N (Nominal)

See Section 3.2.1 d.

b. Nitric Acid (HNO₃), 0.1N (Nominal)

Dilute 6.5 mL of concentrated HNO₃ to one liter with water.

3.2.3 Sample Analysis

3.2.3.1 Reagents for Hexavalent Chromium by DPC Method

a. Water

See Section 3.2.1 a.

b. Potassium Dichromate (K₂Cr₂O₇) Stock Solution

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Dissolve 2.829 g of dried analytical reagent grade $K_2Cr_2O_7$ in water, and dilute to exactly one liter (1 mL = 1000 $\mu\text{g Cr}^{6+}$) with water.

c. Potassium Dichromate Intermediate Solution

Dilute 1.0 mL potassium dichromate stock solution to exactly one liter (1 mL = 1 $\mu\text{g Cr}^{6+}$) with water.

d. Potassium Dichromate Working Standards

Pipet 0, 1, 5, 10, 20, and 40 mL of dichromate standard solution (above) into 50.0 mL flasks and acidify each to pH 2.0 ± 0.5 with 1:1 HNO_3 . Add 10 mL DPC and dilute to

205.1-29

b. Disodium Hydrogen Phosphate Heptahydrate

c. Sodium Iodide

d. Ammonium Acetate

e. Lithium Hydroxide Monohydrate

f. 1,5-Diphenylcarbazide (DPC)

g. Methanol, HPLC Grade

h. Sulfuric Acid, 96 Percent, Spectrophotometric Grade

i. Water

J. Degassed Water

Bubble helium through one liter of water for about 10 minutes.

k. Eluent Stock

Prepare by dissolving the following reagents in water.

205.1-31

exactly 50.0 mL with water. This corresponds to 0, 1, 2, 5, 10, 20, and 40 μg of hexavalent chromium.

e. Acetone, ACS Reagent Grade

f. Diphenylcarbazide Solution

Dissolve approximately one-half gram of 1,5-diphenylcarbazide (DPC) in approximately 100 mL acetone. Store in a brown bottle. Discard when the solution becomes discolored.

3.2.3.2 Reagents for Hexavalent Chromium by IC Method.

a. 2,6-Pyridinedicarboxylic Acid (PDCA)

205.1-30

(PDCA is slow to dissolve, and heating the solution before addition of the remaining reagents may be used to increase the rate of dissolution).

20.0 mM (3.34 g/L) Pyridinedicarboxylic Acid (PDCA)

20.0 mM (5.36 g/L) Disodium Hydrogen Phosphate Hepta-hydrate ($Na_2HPO_4 \cdot 7H_2O$)

100.0 mM (15.0 g/L) Sodium Iodide (NaI)

500.0 mM (38.5 g/L) Ammonium Acetate ($NH_4C_2H_3O_2$)

28.0 mM (1.18 g/L) Lithium Hydroxide Mono-hydrate ($LiOH \cdot H_2O$)

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l. Eluent

Prepare by diluting 100 mL of the eluent stock to 1 liter with degassed water. The pH of the diluted eluent should be between 6.70 and 6.80. Use a pH meter for this preparation.

m. Post-Column Reagent

Prepare by dissolving 0.49 g of 1,5-diphenylcarbazide (DPC) in 100 mL of methanol. Add this solution to about 500 mL of degassed water containing 25 mL of concentrated sulfuric acid. Dilute to 1 liter with degassed water.

n. Potassium Dichromate Stock

Same as Section 3.2.3.1 b.

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Either procure a certified aqueous standard from a supplier (e.g., Spex Industries, Alpha Products, or Fisher Scientific) and verify by comparison with a second standard, or dissolve 2.829 g of dried $K_2Cr_2O_7$, analytical reagent grade) in water and dilute to exactly one liter (1 mL = 1000 $\mu\text{g Cr}^{6+}$).

c. Chromium Intermediate Solution

Dilute 10 mL of chromium stock solution above) to 100 mL with 2.5 percent (v/v) HNO_3 solution (1 mL = 100 $\mu\text{g Cr}$).

d. Chromium Working Standards

The working range of flame AAS is approximately 0.1 to 50 $\mu\text{g/mL}$. Prepare a minimum three point calibration curve. The lowest absorbance reading should be 0.01, and the linear

205.1-35

o. Potassium Dichromate

Intermediate Solution

Same as Section 3.2.3.1.C.

p. Potassium Dichromate Working Standards

Make a five point calibration curve by diluting the potassium dichromate intermediate with water. The standards must bracket the lowest sample concentration, and the highest standard must not be more than 10 times the lowest standard.

3.2.3.3 Reagents for Total Chromium by Flame-AAS

a. Water

b. Chromium Stock Solution (1000 $\mu\text{g/mL}$)

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regression must have a correlation coefficient of 0.997 or better. For many instruments, this can be done by taking 1, 5 and 10 mL of intermediate, and diluting each to exactly 100 mL with 2.5 percent (v/v) HNO_3 solution. This corresponds to 1, 5 and 10 $\mu\text{g/mL}$. These standards must be made fresh daily.

e. Nitrous Oxide

f. Acetylene

3.2.3.4 Reagents for Total Chromium by Furnace-AAS Method

a. Water

b. Nitric Acid (HNO_3)

Low trace metal.

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c. Hydrogen Peroxide (H₂O₂)

30 percent (optional).

d. Calcium Nitrate Solution
(Optional)

Dissolve 11.8 g of calcium nitrate, Ca(NO₃)₂·4H₂O, in water and dilute to one liter. If the instrument manufacturer recommends a different matrix modifier, then use that reagent.

e. Chromium Stock Solution (1000 µg/mL)

Either procure a certified aqueous standard from a supplier (e.g., Spex Industries, Alpha Products, or Fisher Scientific) and verify by comparison with a second standard, or dissolve 2.829 g of dried potassium dichromate (K₂Cr₂O₇, analytical reagent

grade) in water and dilute to exactly one liter (1 mL = 1000 µg Cr).

f. Chromium Intermediate Standard Solution (A)

Take 10 mL of chromium stock solution and dilute to exactly one liter with water (1 mL = 10 µg Cr).

g. Chromium Intermediate Standard Solution (B)

Take 10 mL of chromium intermediate (A) and dilute to exactly one liter with 2.5 percent (v/v) nitric acid solution (1 mL = 100 ng chromium).

h. Chromium Working Standards

The working range of furnace AAS is approximately 1 to 20 ng/mL. Most furnaces pipet

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automatically. They adjust the volume of the injected solution standard to generate a calibration curve. Prepare a 20 ng/mL standard by taking 20 mL of chromium intermediate (B), and diluting to exactly 100 mL with 2.5 percent (v/v) HNO₃ solution. Make fresh daily.

In addition, 1 mL of 30 percent H₂O₂ and 1 mL of calcium nitrate may be added to lessen interferences.

3.3 Pretest Preparation

All sampling and analytical containers which come in contact with the sample must be thoroughly cleaned with detergent and water, and rinsed thoroughly with tap and deionized water. Soak non metal parts in 1:1 HNO₃ for at least one hour, rinse thoroughly with water, and allow to air-dry (this includes the probe liner, sample lines and impinger connectors, impingers, sample containers and beakers, filtration apparatus,

watch glasses, pipets, etc). Rinse metal parts (such as the nozzle and filter holder) with 1:1 HNO₃ and water, and allow to air-dry. Protect the equipment from contamination by closing all the openings with clean plastic caps.

3.4 Preparation of Sample Collection Train

During the preparation and assembly of the sampling train, keep all openings covered, until just prior to assembly.

Assemble the impingers in the train as shown in Figure 205.1-1. Place about 100 mL of 0.02N NaHCO₃ in each of the first two impingers. Leave the third impinger empty. Place approximately 200 to 300 g of silica gel in the fourth impinger and record its weight to the nearest 0.5 g.

Do not use grease on the impinger joints, or anywhere else in the sampling train upstream of the filter, to preclude the possibility of contamination of the sample with grease, which interferes severely with hexavalent chromium analysis.

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If moisture content is to be determined gravimetrically, weigh each impinger plus its contents to the nearest 0.5 g and record the weights.

Using a tweezer or clean disposable surgical gloves, place the Teflon filter in the filter holder. If the filter support is made of stainless steel, protect the sample filter from the support by first placing a glass fiber filter on the support. Be sure that the filter(s) are properly centered and the gasket properly placed to prevent the sample gas stream from circumventing the filter. Assemble and tighten the filter holder. Connect the impingers and filter holder as shown in Figure 205.1-1, using glass, Teflon, or polyethylene tubing.

Prepare a blank train using the same procedure as above.

3.5 Leak Check

The sample collection train may be leak checked in the laboratory after assembly using the procedure in Section 2.5.

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these rinses to the sample container. Check the pH of the NaHCO_3 fraction with a pH meter. Adjust to pH 7 to 8 using 1:1 HNO_3 . Record the total weight of the recovered sample to the nearest 0.1 g. Make a final 0.1N HNO_3 rinse of the sampling equipment, and pour it into another acid-washed LPE container (this fraction is also analyzed for total chromium).

Carefully remove the sample (Teflon) filter from the filter holder, and insert it into the NaHCO_3 fraction. Discard the glass fiber filter if it was used to shield the Teflon filter from a stainless steel filter support. Seal the container and mix well. Mark the liquid level on the container and label it to identify its contents. Refrigerate at 4°C until analysis.

Recover the blank train using the same procedure.

3.7 Sample Analysis

3.7.1 Hexavalent Chromium by DPC Method

Inspect the sample container to determine if a noticeable amount of liquid has been lost. If it has, either void the sample

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3.6 Sample Recovery

The sample must be recovered within a few hours of sampling, as overnight storage can lead to significant sample degradation. Furthermore, it is strongly recommended that the intact and secured train be delivered to the laboratory for recovery. On recovery, inspect the train for general condition. Note if the silica gel is expended, or any unusual conditions that may affect results.

Recover the sample in an area protected from the wind and free from dust and possible contamination by chromium or organic materials. Wipe the outside of the train components to prevent any contamination of the sample. Disconnect the train components. Weigh each impinger plus contents to the nearest 0.5 g and record these weights.

Transfer the impinger contents to an acid-washed linear polyethylene (LPE) sample container, tared to the nearest 0.1 g. Using the minimum necessary for quantitative recovery, rinse the nozzle, probe liner, impingers, and connectors with 0.02N NaHCO_3 at least three times. Add

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or correct the results using methods approved by the Executive Officer.

First calibrate the spectrophotometer as described in Section 3.9.1. Take two 40.0 g aliquots of the sample in 50 mL volumetric flasks. This can be done by pouring from a beaker into the tared flask, and adding drops with a plastic eyedropper until the 40.0 g shows on the balance. One aliquot is used for analysis and the other one is used for spiking and recovery testing. Adjust the pH of each aliquot to 2 ± 0.5 with approximately 1 mL of 1:1 HNO_3 . Shake carefully to release carbon dioxide. Add 1.0 mL of diphenylcarbazide solution, and dilute to the mark with water. Allow the solution to stand for about 10 minutes, then transfer to an absorption cell and measure the absorbance at 540 nm using water in the reference cell. If the absorbance of the sample exceeds the highest standard (40 $\mu\text{g Cr}^{6+}$) as determined in Section 3.9, pipet an aliquot into a volumetric flask, and dilute to the mark with water. Dilute the 0 μg standard by an equivalent amount

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to obtain a blank for that sample. Subtract the 0 µg standard reading (not the field blank) to obtain the net absorbance of the sample. Measure the blank train using the same aliquot sizes and dilutions as above, and subtract the reagent blank to determine the net absorbance of the blank train.

Check for matrix effects on the Cr⁶⁺ results. Since the analysis for Cr⁶⁺ by colorimetry is sensitive to the chemical composition of the sample (matrix effects), check at least one sample from each source point using the method of standard additions as follows: Spike the reserved aliquot with an aliquot of standard solution that increases the Cr⁶⁺ concentration by at least 50 percent (or to a minimum of 10 µg) and analyze the sample as described in the paragraph above. Calculate the Cr⁶⁺ mass (in µg) in the aliquot of the unspiked sample solution by using equation 3.8.1 in Section 3.8.

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falls on the calibration curve. Complete the run with a final calibration curve, and evaluate the whole analysis as described in Section 3.10.2.

The following specific instructions are given for the Dionex IC pre concentration mode. Consult manufacturer's operating manuals for other instruments or direct injection mode.

Convert Dionex IC to the sample preconcentration mode by replacing the sample loop with a preconcentrator column.

Fill the post-column reagent and eluent reservoirs and verify that the power and compressed air are on. Degas the post-column reagent by bubbling helium through it for 10 minutes, and cover the reservoir. Turn on the detector power, set the filter wheel to 520 nm (No. 4). Turn on the eluent pump, and measure the eluent flow at the waste line using a 5 mL graduated cylinder and stopwatch. The

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Volume corrections will not be required since the solutions as analyzed have been made to the same final volume and dilution. If the results of the method of standard additions procedure used on the single source sample do not agree to within 10 percent of the value obtained by the routine spectrophotometric analysis, then reanalyze all samples from the source using the method of standard additions.

3.7.2 Analysis for Hexavalent Chromium by IC Method

Any sample that yields an absorbance of less than 0.010 by the DPC method must be analyzed for hexavalent chromium by the IC method.

The IC must first be calibrated as described in Section 3.9.2. Then, using the same sample volumes and instrument parameters, analyze the samples, blank trains, spikes and check standards (described in Section 3.10.2). If any sample exceeds the highest standard, it must be diluted with eluent so that it

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flow should be 0.9 mL per minute. If not, adjust the flow by using the dial on the eluent pump.

Turn on the post-column reagent pump and measure the total flow at the waste line. The total flow should be 1.2 mL per minute. If not, adjust the flow by using the flow control dial on the post-column reagent pump.

Place the sample inlet line in water, switch to "inject", and turn on the sample pump for a few minutes. This flushes the side loop and sample pump with water. Then turn the pump off.

Place the sample inlet line in an accurately known volume of sample. Switch to "load" and immediately turn on the sample pump. When the liquid is almost gone (CAUTION! Do not let air get in the line) add enough water to allow pumping for an additional 10 minutes. This loads the entire sample onto the concentrator column. Turn off the pump and switch the valve to "inject". This will begin to

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- m_{ch} = Mass of Cr^{6+} or Cr (total) reported by the laboratory, μg
- $V_m(std)$ = Total sample volume at standard condition, decm

