Discussion Document

Proposed Amendments to the *Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations*



Environnement et Changement climatique Canada



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Acronyms and Abbreviations

- ECCC Environment and Climate Change Canada
- CEPA Canadian Environmental Protection Act, 1999
- HVC Hexavalent chromium
- mg/dscm Milligrams per Dry Standard Cubic Meter
- dyn/cm Dynes per Cubic Meter
- Regulations Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations
- REACH Registration, Evaluation, Authorization and Restriction of Chemicals
- **ROC Representative Operating Conditions**
- SCAQMD South Coast Air Quality Management District
- U.S. EPA United States Environmental Protection Agency

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1 Introduction

The Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations (the Regulations) came into force in July 2009. The Regulations require the control of air releases of hexavalent chromium (HVC) compounds from tanks used in the specified activities. HVC compounds are listed in Schedule 1 (List of Toxic Substances) to the Canadian Environmental Protection Act, 1999 (CEPA).

Environment and Climate Change Canada (ECCC) proposes to amend the Regulations in order to:

- further reduce emissions of HVC compounds from regulated operations;
- harmonize requirements with other jurisdictions; and
- update and clarify regulatory requirements.

The purpose of this discussion document is to provide an overview of the existing Regulations, outline proposals and invite information and perspectives that will inform the further development of proposed amendments. In order to elicit feedback and identify areas where further discussion may be needed, questions are posed for each proposal or group of proposals. Proposals are grouped in the following themes:

- application
- control methods
- release limits
- maintenance
- testing
- notices and reporting

Chromium is widely used in the metal finishing industry because of its performance characteristics related to corrosion resistance, durability, and hardness, as well as for decoration. Electroplating, anodizing, and reverse etching activities that use a solution containing a HVC compound generate air releases of HVC compounds which, if not controlled, can enter the workplace and the environment.

Currently, approximately 146 chromium surface finishing facilities in Canada are subject to the Regulations. This represents approximately 330 regulated tanks, since some facilities have more than one regulated tank. Regulated facilities are concentrated in Ontario (36%), British Columbia (20%), Quebec (19%) and Alberta (11%). While a few large operations are owned by major companies, the majority (90%) are small businesses. The Government of Canada defines a small business as any business, including its affiliates that has fewer than 100 employees or has between \$30,000 and \$5 million in annual gross revenues.

2 Overview of Existing Regulatory Requirements

2.1 Application

These regulations apply to facilities that, during a calendar year, use 50 kg or more of chromium trioxide for chromium electroplating, chromium anodizing or reverse etching.

Chromium trioxide generates HVC compounds when used in regulated activities.

2.2 Control methods

Regulated facilities must control the release of HVC compounds by one of the following methods:

- using a point source which has emissions control equipment (control devices),
- limiting the surface tension of the solution in the tank, or
- using a tank cover

If releases are controlled by using a point source, they must not exceed a specified release limit. These facilities are required to conduct a release test and report at least every 5 years. The Regulations specify conditions for testing and the information to be contained in reports. In addition, there are requirements for the preparation and implementation of inspection and maintenance plans for control devices.

Facilities that control releases of HVC compounds by limiting the surface tension must maintain a surface tension below specified values, which depend on the measurement device used. Measurements are recorded at a frequency prescribed in the Regulations, and reports are submitted twice a year. No inspection or maintenance conditions are specified in the Regulations.

If a tank cover is used to control releases, it must have specific characteristics including an evacuation device with a HEPA filter. There are requirements for the inspection and maintenance of tank covers, and a smoke test must be conducted every three months to determine whether the tank cover leaks. In the case of a leak, certain actions must be taken. There are no regular reporting requirements related to tank covers, but records must be kept.

2.3 Reporting

Facilities are required to submit a notice indicating the control method used for each tank and report on their implementation:

- point source method: release test report at least every 5 years
- surface tension method: reports are submitted twice per year
- tank cover: no reporting

Regardless of the control method that is used, where there occurs or is a likelihood of a release into the environment of HVC compounds in contravention of the regulations, a written report is required. Also, regulated facilities are required to keep records and other information required by the Regulations for at least five years.

2.4 Summary of Proposed Amendments 2017 and 2022

In 2017, ECCC proposed amendments to the Regulations and engaged with stakeholders. On April 1, 2020, the Regulations were amended to address some of the 2017 proposals, specifically to:

• improve consistency between the French and English versions;

- improve the clarity of the regulatory text related to laboratory accreditation; and
- provide regulated parties with more flexibility by removing reference to an outdated technical standard.

Other proposals raised in 2017 were not addressed in the 2020 amendments. Table 1 summarizes the amendments that are now proposed and whether they were proposed in 2017.

Table 1 Summa	ry of Proposed	Amendments 2	017 and 2022
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Proposed amendments	2017 Proposed amendment	2022 proposed amendment
Application		1
Clarify "use"	None	Clarify that 50 kg use refers to the total amount of CrO ₃ contained in tanks used for regulated activities at the beginning of the calendar year in addition to the total amount of CrO ₃ added to those tanks throughout the calendar year.
Control Methods		
Remove the method of using a tank cover	None	Remove the allowance of tank covers as a control method
Clarify allowance for combined control methods	Proposed	Continue to propose
Release Limits		
Point Source Release Limits	None	Lower point source release limits
Surface tension limits	None	Lower surface tension limits
Maintenance		
Addition of maintenance procedures for surface tension measurement equipment	Proposed	Continue to propose
Temporary use of the surface tension control method	Proposed	Continue to propose
Testing		
Frequency of reporting - release tests	None	Increase the frequency of release tests
Conditions for release tests	Proposed replacing "electrical output" with "amperage" Proposed allowing dilution air under certain circumstances	Review the definition of representative operating conditions, including electrical output and dilution air
Sampling method –for release test	Require USEPA Method 306 with additional specifications	Require use of USEPA Method 306
Method detection limit –for release test	None	Lower method detection limit
Surface tension measurement and recording	Require immediate corrective action if the measured surface tension value exceeds the regulatory limit	Continue to propose
Reporting		

Proposed amendments	2017 Proposed amendment	2022 proposed amendment
Frequency and Content of Release	Proposals for reporting on	Continue to propose
Test Reports	inspection and maintenance	
	plans for control devices and	
	local exhaust ventilation systems	
	None	Propose additional changes to the content of release test
		reports
	None	Require third-party validation of release test results
	None	Increase the frequency of release test reports
Frequency and content of surface	Report exceedances of the	Continue to propose along with additional changes to the
tension reports	surface tension limit and the	content of surface tension reports
	corrective measure taken	

3 Proposed Amendments

3.1 Application

Current requirement

Section 2 of the Regulations state that the regulations apply to any person that uses a solution containing a hexavalent chromium compound for chromium electroplating, chromium anodizing or reverse etching in a tank located at a facility where 50 kg or more of chromium trioxide (CrO₃) is used per calendar year.

Proposed Amendment

ECCC proposes to clarify the application of the Regulations as it relates to the 50 kg per calendar year use threshold for chromium trioxide.

It is proposed to amend the Regulations to state that the 50 kg use refers to the total amount of CrO_3 contained in tanks used for regulated activities at the beginning of the calendar year plus the total amount of CrO_3 added to those tanks throughout the calendar year.

Rationale

• clarify the threshold for the application of the Regulations

Focus Questions

- Q1. Are there any concerns with the CrO₃ usage definition?
- Q2. If possible, please provide the volume and maximum concentration of CrO3 for each tank used for regulated activities.

3.2 Control Methods

Current requirement

Subsection 3(1) of the Regulations requires that the release of HVC compounds from each regulated tank be controlled by one of three methods:

- the use of a sealed tank cover
- limiting the surface tension of the plating solution, typically done by adding a fume suppressant, or
- the use of point source control

There are two proposed amendments as follows.

3.2.1 Remove the method of using a tank cover

Proposed Amendment:

It is proposed to remove the option of using a tank cover as a control method.

Rationale

- ECCC has not been notified and is not aware of any facility in Canada that uses a tank cover for chromium electroplating, anodizing or reverse etching
- the use of a tank cover could restrict access to operating tanks
- tank covers may not represent current best practices

Focus Question

Q3. How will the proposal to remove the tank cover control method affect your operation?

3.2.2 Clarify allowance for combined control methods

<u>Proposed amendment</u>: It is proposed to modify the regulatory text to clarify that the combination of the point source and surface tension limiting control methods is allowed.

<u>Rationale</u>

- provide clarity
- using a secondary control method may further lower the concentration of HVC compounds released into the environment, including by reducing fugitive emissions into the workplace

 the approach aligns with industry practice and other jurisdictions including Ontario¹, the U.S.² and California³

Focus Question

Q4. Please share any comments or perspectives on this proposal, including any examples of how using combined methods could help your operations?

3.3 Release Limits

3.3.1 Point Source Release Limits

Current requirement

Subsection 4(1) of the Regulations prohibits facilities using the point source control method from releasing more than 0.03 mg/dscm (dry standard cubic meter of sample gas) of HVC if measured separately, or, in any other case, of total chromium, from any point source.

Proposed Amendment

It is proposed to reduce point source release limits for HVC from 0.03 mg/dscm to 0.011 mg/dscm for existing point sources. In addition, a new release limit of 0.006 mg/dscm for new or modified point sources is proposed. Definitions for "new" and "modified" point sources would be proposed in the Regulations. The reduced limits would also apply to facilities that use a combination of control methods.

Rationale

- lower release limits will contribute to reducing emissions of HVC compounds from regulated operations
- recent release test reports indicate that 85% of point sources would meet the proposed limits
- ongoing improvements in release reduction technologies, as well as improved operation and maintenance practices, should allow all facilities to meet the proposed lower limits

¹ Ontario Environment and Energy, "Metal finishers - Industry standard", July 27 2016 [Online]

² Electronic Code of Federal Regulations, "NESHAP §63.343 (c)(7)- Performance test requirements and test methods", 22 June 2020 [Online]

³ California Air Resources Board, "§ 93102 Airborne Toxic Control Measure for Chromium Plating and Chromic Acid Anodizing Facilities", October 24, 2007 [Online]

3.3.2 Surface Tension Limits

Current requirement

Section 7 of the Regulations requires facilities that control releases by limiting the surface tension of a solution containing a HVC compound to maintain the surface tension at a value of less than 35 dyn/cm (if measured with a tensiometer) or 45 dyn/cm (if measured with a stalagmometer).

Proposed amendment

For facilities controlling their HVC compounds releases by limiting the surface tension, including in combination with the point source control method, it is proposed to lower the surface tension limits to no greater than 33 dyn/cm (when measured using a tensiometer) or 40 dyn/cm (when measured using a stalagmometer). The proposed surface tension limits correspond (produce an equivalent reduction) with the proposed point source release limit for new or modified sources⁴.

<u>Rationale</u>

- lower surface tension limits will contribute to reducing emissions, including fugitive emissions, of HVC compounds from regulated operations
- in recent (2019-2020) reports, 70% of facilities reported surface tension values equal to or lower than the proposed limits;
- the proposed limits align with US federal chromium standards
- a number of studies show that lower releases have a positive impact on the health and safety of workers and the communities that surround regulated facilities

Focus Questions

- Q5. What challenges could facilities have in meeting the proposed limits?
- Q6. Please share any comments or perspectives on this proposal.

3.4 Maintenance

Current requirements

Section 6 of the Regulations sets out requirements for inspection and maintenance of point source control devices. Section 9 specifies requirements for inspection and maintenance of tank covers. Both sections set out record keeping requirements. However, the Regulations do not require any inspection and maintenance, or record keeping actions associated with the inspection and maintenance for surface tension control methods.

⁴ RTI. (2012). Draft – Development of revised surface tension limits for chromium electroplating. North Carolina, USA

3.4.1 Addition of maintenance procedures for surface tension measurement equipment

Proposed Amendment

It is proposed to require that all facilities that control emissions by limiting the surface tension, whether combined with the point source control method or not, follow the calibration and maintenance procedures at the prescribed frequency in accordance with the manufacturer's instructions for the surface tension measurement equipment/instrument (tensiometer or stalagmometer) used or in accordance with ECCC's proposed checklist. The facility would be required to keep the relevant manufacturer's instructions on-site and maintain an inspection, calibration and maintenance log record. If defects are identified during inspection or maintenance, the facility would be required to cease regulated activities, correct the defect and verify that the defect is corrected before resuming regulated activities. It would be required to keep records of these actions.

Rationale

 maintenance of surface tension measurement equipment is crucial to ensure the accuracy of HVC measurements

Focus Question

Q7. How can the accuracy of the readings taken by the surface tension device be maintained other than maintaining it in accordance with the instrument manufacturing instructions?

3.4.2 Temporary use of the surface tension control method

Current requirements

When using the point source control method, in the case that a defect is identified during inspection and maintenance of control devices, subsection 6(4) of the Regulations requires facilities to cease any regulated operations, correct the defect and verify that the defect has been corrected before resuming any of those activities.

Proposed Amendment:

We propose to allow a facility to switch control methods to surface tension control, for up to a maximum of 75 days, in temporary situations.

Focus Questions

Q8. Have you ever faced a situation where your operations required, or would have benefited from, a temporary switch in control method? What was the situation and how was it managed?

3.5 Testing

3.5.1 Release Tests

Current requirements

Section 5 outlines requirements regarding the frequency and conditions for performing a release test for regulatees that control releases using a point source method.

In general, release tests are required to be performed every 5 years. Additional testing is required in specific circumstances (e.g., a control device is replaced, there is an increase to the number or size of tanks, or changes are made to the ventilation system).

The test conditions include requirements related to:

- performing the test under representative operating conditions without using dilution air
- sampling method
- laboratory accreditation
- analytical method, including method detection limit

Proposed Amendment regarding frequency of release tests

It is proposed to require annual release tests in two consecutive years following publication of the amended Regulations. If the release limits are met for each of the first two years, the frequency for subsequent release tests and reports would be every three years. This requirement would also apply to facilities using combined control methods, in the case where the surface tension value is not maintained below the regulated surface tension limit.

Rationale:

Increasing the frequency of the release test will:

- demonstrate ability to achieve levels of HVC that meet the lower release limits and other requirements of the amended Regulations
- lead to quicker corrective actions and a greater reduction in emissions in cases of equipment malfunction or in any other case where regulatory requirements are not met

Focus Questions

Q9. What would more frequent tests mean to your facility? What are the costs and other considerations?

Proposed Amendments regarding conditions for release tests: Representative operating conditions

The Regulations define representative operating conditions as meaning the conditions for obtaining an electrical output from a tank's rectifier while regulated activities are taking place that is equal to the average of the rectifier's output for the 30 days of use before the release test is performed. Paragraph 5(4)(a) of the Regulations requires that every release test be performed under representative operating conditions without using dilution air. Dilution air is defined as air that is introduced into emissions produced from or during any of the regulated activities.

It is proposed to review the definition of "representative operating conditions" in order to assess whether it represents current industry practices and terminology. Elements of the definition that will be reviewed include:

- whether to specify an electrical output (e.g. amperage) in the definition
- whether 30 days is an appropriate length of time to determine representative conditions for all regulated activities
- whether the definition should refer to total rectifier rated capacity, dilution air, air sparging, surface tension, or other operating practices or parameters

Rationale

- reflect current industry practices
- align with other jurisdictions
- provide clarity to the definition
- simplify and clarify reporting requirements
- increase accuracy in release test results

Focus Questions

- Q10. Are you interested in participating in the review of the definition for representative operating conditions?
- Q11. Which elements of the current definitions are most important to review? Please provide supporting information.
- Q12. Are there other considerations that should be examined for inclusion in representative operating conditions?

Other proposed amendments regarding release test conditions

It is also proposed to:

- refer to USEPA Method 306 for sampling (Method 306 also references analytical methods)
- refer to EPS/RM/8 reference method
- lower the method detection limit from 8 µg/L to 4 µg/L to align with current practice
- allow the sample runtime to vary to achieve the minimum required sample volume

Rationale:

- reflect current industry standards and practices
- increase regulatory clarity by providing more specific conditions for release tests

Focus Questions

- Q13. What other air sampling methods can verify compliance with the regulations?
- Q14. What are common laboratory method detection limits given current practice?

3.5.2 Surface tension measurement and recording

Current Requirements

Section 7 outlines requirements regarding the measurement and recording of surface tension for regulatees that control releases by limiting the surface tension of a tank solution containing a HVC compound.

Proposed Amendments:

It is proposed to require measurement and recording of the following additional information:

- surface tension before the commencement of regulated activities
- the time at which surface tension measurements are taken

In addition, it is proposed to require immediate corrective action if the measured surface tension value exceeds the regulatory limit. Corrective action could include immediately stopping any regulated activities and adding fume suppressant. Following corrective actions, it would be required to re-measure and record the surface tension to ensure the regulatory limit is met prior to resuming activities.

Rationale:

- help ensure the maintenance of surface tension values below the regulatory limit
- provide clarity for facilities which measure a surface tension value exceeding the regulatory limit

Focus Questions

- Q15. What measures are successful in keeping the surface tension value at or below the limit?
- Q16. What measures are successful in correcting exceedances?

4 Notices and reporting

4.1 Notices

The regulations require the submission of a Control Method Notice and, for regulatees that use the point source control method, a release test notice.

4.1.1 Control method notice

Current requirements

Subsection 3(2) requires the submission of a Control Method Notice indicating, for each regulated tank, the method used to control the release of HVC.

In addition, subsection 3(4) requires a 30-day notification when there is an intention to change the control method for a tank or the surface tension measurement for a tank.

Proposed Amendment:

It is proposed to remove the 30-day notification requirement when the control method is temporarily changed due to unforeseen circumstances, for example when a defect is detected during inspection and maintenance of a point source control device. A facility that temporarily changes a control method in this manner would be required to revert to the original control method within 75 days.

The facility would be required to comply will all requirements (for example release limits, testing and reporting, inspection and maintenance) applicable to the temporary control method as long as it is in use.

Rationale:

- the change in control method is unforeseen, therefore the 30 day notification is not possible
- omitting the submission of a control method notice under these conditions reduces the administrative burden
- removing the 30-day notification requirement allows facilities to continue production while controlling their emissions

Focus Question

Q17. Has a temporary switch in control method to maintain the original control device lasted more than 75 days?

4.2 Reporting

The regulations require the following reports:

- As per section 11 subsection 1, a release test report 75 days after completing a release test
- As per section 11 subsection 2, a surface tension report every 6 months

• As per section 12, a report must be submitted if HVC compounds have been released or if there is a likelihood to have been released into the environment, in contravention of the Regulations

4.2.1 Frequency and content of Release Test Reports

Current requirements

In general, release tests reports are required every 5 years. Subsection 11(1) requires the submission of a release test report within 75 days after the last sample is taken for the release test and specifies the information to be contained in reports. Information includes significant technical details respecting each point source and the associated tanks.

ECCC uses the information contained in release test reports to confirm compliance with regulatory requirements including the release test limit and to validate reported release test values.

In recent years, ECCC validation found that:

- 97% of the release tests results are in compliance with the regulated limit
- For 62%, validation resulted in a value different from the reported value
- In 79% of reports, the validation would have benefited from additional information (for example regarding tank configurations or representative operating conditions)

Proposed Amendment

It is proposed to amend the content and frequency of reports for facilities using the point source control method.

It is proposed that release test reports include:

- third-party validated release test results
- reporting on inspection and maintenance and any changes in operation and design of point source control equipment
- Information on the amount of chromium trioxide used and the number of operation days in the calendar year
- information on any use of a temporary control method since the previous report

ECCC would work with regulatees and other expert stakeholders to develop validation guidance and results templates.

Regarding the frequency of release test reports, it is proposed to require annual third-party validated release test reports in the first two years following entry into force of the amended Regulations, after which the frequency would be every three years in cases where the first two annual reports demonstrate compliance with regulated limits. Annual reports would be required for all other elements.

Rationale

- Increasing the frequency of reporting for the first operational years of the facility will ensure that the control device is meeting the regulatory limits
- Reporting on changes since the last release test report will reduce burden on regulatees and program

Focus Question

Q18. How will changing the reporting requirement affect the reporting on the release test?

4.2.2 Frequency and content of surface tension reports

Current Requirements

The reporting frequency and information to be contained in surface tension reports is identified in subsection 11(2). Reports are submitted twice a year (January and July).

Proposed Amendments

For those controlling the release of HVC compounds by limiting the surface tension of the solution in the tank (as a permanent or temporary measure) it is proposed to amend the content of the reports.

It is proposed that surface tension reports include:

- information on any exceedances of the regulated limits, a description of the corrective measures undertaken, and the results of corrective measures
- reporting on inspection and maintenance and any changes in operations and design of surface tension measurement equipment
- information on the amount of chromium trioxide used and the number of operation days in the calendar year
- information about the fume suppressant(s) that are used
- information on any use of a temporary control method since the previous report

<u>Rationale</u>

- provide regulatory clarity for facilities which obtain a surface tension value exceeding the limit
- additional information will promote maintaining surface tension below the regulatory limit

Focus Question

Q19. How would the proposals on surface tension reports affect your operation and reporting?

5 Next Steps

Online information sessions will be held in November, 2022 to walk through the proposals in this document. Information on these sessions can be found online at: <u>https://www.canada.ca/en/environment-climate-</u> change/corporate/transparency/consultations/chromium-regulations.html

We welcome your feedback on the proposed amendments. The focus questions in this document are a guide only. You do not have to answer all the questions, and all comments are welcome. Please include whenever possible the rationale behind your views and give supporting evidence where available.

In addition, we would like to know about your areas of interest to help us plan any further consultation and engagement. Please identify in your submission your priority topics from the list below and indicate whether you would like to be further engaged on those priorities.

- 1. General overview of proposals
- 2. Specific topics:
 - a. application
 - b. control methods
 - c. release limits
 - d. maintenance
 - e. testing
 - f. notices and reporting

The feedback on this discussion document and any subsequent engagement will inform the development of the proposed amendments to the *Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations* which will be published in the *Canada Gazette,* Part 1, for public comment for a 60-day comment period. A summary of all comments and feedback received from this discussion document, with responses, will be published in advance of publication in the *Canada Gazette,* Part I.

5.1 How to make a submission

You are invited to submit comments in writing by December 7, 2022 by either:

- responding to focus questions in the online submission form available at: <u>https://forms.office.com/r/sYY8UuvPZH</u>; or
- sending an email with your comments to <u>EC.Chrome@ec.gc.ca</u>.

If you are sending your comments by email, please include the following information:

- "Comments on the proposed amendments to the Regulations" in the subject line
- your name and organization
- your postal address
- your telephone number
- your email address
- identification of any confidential business information contained in your submission

For more information

Please send any queries to: EC.Chrome@ec.gc.ca

6 References

- 1. Ontario Environment and Energy, "Metal finishers Industry standard", July 27 2016. [Online]
- 2. Electronic Code of Federal Regulations, "NESHAP §63.343 (c)(7)- Performance test requirements and test methods", 22 June 2020. [Online]
- 3. California Air Resources Board, "§ 93102 Airborne Toxic Control Measure for Chromium Plating and Chromic Acid Anodizing Facilities", October 24, 2007. [Online]
- 4. *RTI.* (2012). Draft Development of revised surface tension limits for chromium electroplating. North Carolina, USA
- 5. United States Environmental Protection Agency, "National Emission Standards for Hazardous Air Pollutants (NESHAP) for hard and decorative chromium electroplating and chromium anodizing tanks, 40 CFR Part 63, subpart N," amended on September 19, 2012. [Online].
- California Air Resources Board, "Airborne Toxic Control Measure Technical Working Group #1" 11 September 2020. [Online]
- European Chemicals Agency (EACHA). "Authorisation List Annex XIV Chromium trioxide", 2016.
 [Online]
- European Parliament, "European Parliament resolution on the draft Commission implementing decision partially granting an authorisation under Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACHLaw Ltd) for certain uses of chromium trioxide", February 21 2019. [Online]
- 9. The Dutch National Institute for Public Health and the Environment, "Analysis of REACH authorisation requests: inventory of alternatives for chromium-6", 2020. [Online]

Appendix I

1 Requirements in Provincial Jurisdictions

1.1 Ontario

In 2005, the Ontario Ministry of the Environment Ontario Ministry of the Environment, Conservation and Parks introduced the *Ontario Local Air Quality Regulation (O. Reg.419/05: Air Pollution -Local Air Quality)*, which aim to limit exposure to substances released from local industrial and commercial facilities into air that can affect human health and/or the environment.

The annual average air standard for HVC is 0.00014 micrograms per cubic meter of air (μ g/m³), which is a point of impingement (POI) limit set at the fence line of a facility, and took effect on July 1, 2016. However, due to technical and economic limitations, it was not possible for all industry to meet the air standard. Therefore, in March 2016, MECP published the *Industry Technical Standard for Metal Finishers*, which is a technology-based solution designed for two or more facilities in a sector, and includes requirements for technology to limit HVC releases, operating and maintenance practices, monitoring, inspection and reporting. The Standard does not specify any HVC releases limits for the point source control methods.

1.2 Quebec

The Ministère du Développement durable, Environnement et Lutte contre les changements climatiques du Québec established a HVC emission limit for metallic surface treatment processes through its *Clean Air Regulation*, which is similar to the federal Regulations. As of 2012, any facility with a metallic surface treatment process using a point source control method must limit HVC emissions to 0.03 mg/dscm and undertake point source emission testing every 5 years at a minimum to ensure compliance with the regulatory limits.

The Quebec Regulation alternatively allows the control of HVC emissions by limiting the surface tension. The limits provided align with the federal Regulations.

Since 2011, all Regulated facilities must ensure, via an atmospheric dispersion modelling, that they adhere to the air quality standards.

1.3 Alberta

Alberta Environment and Parks manage air quality in Alberta through the Environmental Protection and Enhancement Act (EPEA). Environmental requirements are based on an activities-based regulatory system, with those activities explicitly defined within the *Activities Designation Regulation*. An electroplating plant requires an approval under EPEA only if meets the following definition "a plant that carries out metal electroplating, anodizing or galvanizing and releases industrial wastewater to the environment other than a wastewater treatment plant."

The Alberta Government has an ambient air quality objective for chromium of $1 \mu g$ m-3 (1-hr average). Alberta does not collect information on hexavalent chromium air emissions beyond the National Pollutant Release Inventory.

1.4 Saskatchewan

Air quality in Saskatchewan is managed through the Industrial Source (Air Quality) Chapter, which applies to larger facilities that are directly listed in the chapter or annually emit a specified amount of air contaminants. The purpose of this chapter is to ensure the province's ambient air quality standards and emission standards are met so that air quality impacts to human health and the environment are minimized. The Environmental Management and Protection (General) Regulations have the ability to regulate the remaining items not specifically covered by the chapter. Saskatchewan does not currently have any HVC emissions limits or other control specifications identified in the Federal Chromium Regulations. In absence of any provincial regulations, facilities must follow any federal requirements.

1.5 Manitoba

The province issues permits to facilities. Facilities must follow any federal requirements.

1.6 British Columbia

The Environmental Management Act governs the management of waste in British Columbia. This includes waste emissions for electroplating activities in the metal processing and metal products manufacturing industry as prescribed in the Waste Discharge Regulations [B.C. Reg. 320/2004]. The Act prohibits waste to be introduced into the environment without authorization (e.g., permit, regulation, approval). The Province delegates air quality regulatory authority to Regional districts, under the BC *Environmental Management Act*. Example HVC requirements within a permit can include release limit and reporting.

1.7 New Brunswick

In New Brunswick, chromium plating operations are regulated through an Approval to Operate. The Approval contains various terms and conditions aimed at minimizing impacts to the environment. Specifically, the Approval for chromium electroplating operations includes a condition requiring the facility to provide a summary report of measurements and test results submitted to ECCC as a requirement of the Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations.

1.8 Newfoundland and Labrador

In Newfoundland and Labrador, the Department of Environment and Climate Change has no applicable legislation specific to hexavalent chromium releases to air from tanks used for chromium electroplating, chromium anodizing or reverse etching. There are no specific hexavalent chromium limits for releases to air.

2 Requirements in Other Jurisdictions

2.1 United States (U.S.) Environmental Protection Agency

On September 19, 2012, the U.S. Environmental Protection Agency (EPA) published the amended National Emission Standards for Hazardous Air Pollutant Emissions for Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks⁵. Facilities undertaking hard chromium electroplating operations have separate emission limits depending on whether they are classified as "large" or "small" facilities. Facilities with chromium anodizing or decorative chromium electroplating operations are all held to the same emission standard and are not partitioned by size.

New sources of emissions from operational tanks, either constructed, or reconstructed, after February 8, 2012, have a more stringent limit. Table II-1 below provides a summary of the emission limits for total chromium (mg/dscm):

Chromium plating process	Point source limit (mg Cr/dscm)
Decorative, hard (new) and anodizing	≤ 0.006 - ≤ 0.007
Hard (existing)	≤ 0.011 - ≤ 0.015

TABLE II-1: U.S. EPA LIMITS FOR SCRUBBER CONTROL, SINGLE TANK (2012)

For facilities that choose to monitor and demonstrate compliance by measuring the surface tension of the bath, the limits are 40 dyn/cm if measured by stalagmometer, and 33 dyn/cm if measured by tensiometer. The U.S. EPA allows the use of more than one control method such as the addition of fume suppressant with a control device.

2.2 California

Chromium plating and chromic acid anodizing facilities in the State of California are regulated under the *Airborne Toxic Control Measure for Chromium Plating and Chromic Acid Anodizing Facilities (ATCM) Regulation* (1). For existing facilities, California Air Resources Board (CARB) prescribes the control method to be used based on the amperage capacity in ampere-hours per year (amp-hr/yr). Unless fume suppressants are permitted, the HVC limit is 0.0015 mg/amp·hr. For new facilities, CARB prescribes the use of a HEPA add-on air pollution control device that achieves an emission limit of 0.0011 mg/amp·hr. New facilities are not permitted to operate within 1,000 feet (approximately 305 meters) from residential, mixed use, or school zones.

Facilities operating at higher amp-hr and/or are located close to sensitive receptors must control their surface tension by the addition of an accepted fume suppressant. The surface tension must not exceed 40 dyn/cm (stalagmometer) and 33 dyn/cm (tensiometer).

⁵ United States Environmental Protection Agency, "National Emission Standards for Hazardous Air Pollutants (NESHAP) for hard and decorative chromium electroplating and chromium anodizing tanks, 40 CFR Part 63, subpart N," amended on September 19, 2012 [Online]

California is currently in consultation to amend their chromium plating regulations⁶). Draft concepts include phase out of the use of hexavalent chromium in favor of trivalent chrome, the addition of non-rectified hexavalent chromium containing tanks, ventilation requirements and inclusion of best management and housekeeping practices.

Distance	Ampere-Hours ¹	Emission limitation
≤ 330 feet	< 20,000	Use of specific chemical fume suppressants ²
≤ 330 feet	> 20,000 - < 200,000	0.0015 mg/amp-hr ³ with add-on control
≤ 330 feet	> 200,000	0.0015 mg/amp-hr with add-on control
> 330 feet	< 50,000	Use of specific chemical fume suppressants ²
> 330 feet	> 50,000 - < 500,000	0.0015 mg/amp-hr
> 330 feet	> 500,000	0.0015 mg/amp-hr with add-on control

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1. Permitted annual / ampere-hours

2. Depends on measurement instrument and specific fume suppressant

3. mg/amp-hr = milligrams per ampere-hour

2.3 Europe

Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) are regulations for the European Union managed by the European Chemicals Agency (ECHA), adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals.

Chromium trioxide (chromium acid) was added to Annex XIV of REACH (referred to as the REACH Authorization List) on April 17, 2013⁷. This List contains Substances of Very High Concern (SVHC), which are banned from the market and cannot be used after September 21, 2017 (the sunset date) without authorization. The aim of the ban is to completely replace chromium trioxide in the long-term by safer substances or techniques.

Some chromium plating processes have currently no technical feasible alternatives. As such, in September 2016, ECHA's Risk Assessment (RAC) and Socio-Economic Analysis (SEAC) Committees reached an agreement on the authorization of chromium trioxide for six uses after the sunset date⁸. The authorizations will allow the use of chromium trioxide in surface treatment processes affecting the aerospace, automotive, locomotive, metal manufacturing and canning industries. Extensions for use authorizations cover all applicable operations regulated under the Canadian regulations. The extension period ranges between four to seven years.

The Dutch National Institute for Public Health and the Environment (RIVM) has reviewed REACH applications for authorization to identify developments in the field of alternatives to hexavalent chromium. They predict that there will be additional information on alternatives in the near future

⁶ California Air Resources Board, "Airborne Toxic Control Measure - Technical Working Group #1" 11 September 2020 [Online]

⁷ European Chemicals Agency (EACHA). "Authorisation List – Annex XIV Chromium trioxide", 2016 [Online]

⁸ European Parliament, "European Parliament resolution on the draft Commission implementing decision partially granting an authorisation under Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACHLaw Ltd) for certain uses of chromium trioxide", February 21 2019 [Online]

and expect that there will be a reduction in active authorizations for chromium trioxide as renewals begin⁹.

⁹ The Dutch National Institute for Public Health and the Environment, "Analysis of REACH authorisation requests: inventory of alternatives for chromium-6", 2020 [Online]