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Chrome Plating ATCM Amendments

Technical Working Group #3

3/11/2021

Meeting Agenda

- Introductions
- Working Group #2 summary
- Actions since Working Group #2
- Trivalent Plating Technology
- Trivalent Cost Conversion Estimates
- Draft Amendment Concepts
- Questions

Working Group #2 Summary

- Facility and emissions inventory
  - 57 dec platers, 41 hard platers, 34 chromic acid anodizing facilities
  - ~4 lb hex chrome actual emissions (10.7 lb of potential emissions)
- Chrome containing non-electroplating tanks
  - Facilities operating chrome containing tanks not subject to ATCM
  - Majority of tanks operating in South Coast and subject to Rule 1469
- Additional compliance measures
  - Summary of some measure taken beyond ATCM requirements

Recent Actions

- Meetings with
  - Metal Finishers Association of California
  - National Association of Surface Finishers
  - Department of Defense experts
  - Other industry representatives
  - Plating chemistry manufacturers
  - California Communities Against Toxics
- Cost estimates for trivalent plating
- Initiated health risk evaluation, CEQA analysis, regulatory concepts

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Trivalent Plating Technology

Decorative Trivalent

- Chloride or sulfate-based systems commercially available
- Works for a wide range of applications (automotive, door hardware, leisure equipment, plumbing fixtures, etc.)
- Range of color options with colors approaching those of hexavalent chrome
- Provides comparable or better (in some case) corrosion resistance and durability
  - Showed better performance in some high chloride environments

Advantages

- Less toxic than hexavalent chrome
- Reduced waste treatment costs
- No PFAS compounds
- Lower energy requirements
- Can withstand electrical current interruptions
- Fewer part defects and rejects
- Similar plating process

Disadvantages

- Color doesn’t match exact with hexavalent chrome plated parts
- Some customer acceptance issues
- Not yet fully accepted by automotive OEMs
- Equipment requirements vary facility by facility
- Different processes for different applications

Functional Trivalent

- Applicable for hydraulic cylinders, ball bearing parts, pump shafts, printing cylinders, brake discs, and other thin dense chrome applications
- Limited functional trivalent plating options on the market
- Technology not currently ready for aerospace and DOD applications

Advantages

- Less toxic
- No PFAS compounds
- No lead anodes
- Some applications can operate at lower temperatures
- Lower chromium concentration in bath

Disadvantages

- High capital expense up front
- Increased operating costs
- More difficult to control
- More complex process
- Doesn’t support complex geometries yet
- Different deposit characteristics

Chromic Acid Anodizing

- No trivalent technology exists to replace chromic acid anodizing
- Looking for input on how to best transition away from hexavalent chromium
- CARB will re-evaluate technology in the future

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Initial Cost Estimates

Cost of Decorative Trivalent

- Price varies by facility size and throughput
- Equipment and installation cost:
  - Small facility (<20,000 amp-hrs/year): ~$60,000 - $100,000
  - Large facility (>20,000,000 amp-hrs/year): ~$250,000 - $310,000
- Operating expenses estimated to be similar to hexavalent chromium
- Requesting any additional cost data for dec trivalent plating operations from industry

Small Facility Estimate
(300 gallon tank, <20,000 amp hrs)

Item	Cost
Equipment: Plating Tank, Rinse Tank, Filter Pump, Ion Exchange System, Anodes, Flight Bar and Saddle	$32,067.00
Chemistry: Chrome 3 Salts, Conductivity Salts, Catalyst, HCD Adjuster, Wetting Agent	$6,329.91
Exhaust Fan	$8,100.00
Ducting	$6,000.00
Freight cost (estimated)	$1,000.00
Hex Chrome Removal (estimated)	$3,000.00
Total	$56,496.91

Cost of rectifier ($15,000) and closed-loop water system ($32,000) not included

Large Facility Estimate (2,200 gallon tank, 24,000,000 amp-hrs)

Item	Cost
Equipment: Tank, rectifier, amp-hr meter, cooling, heating, tank busing, mixing, exhaust, feed pump, anodes, hangers	$150,000
Installation Cost (may vary based on complexity of old tank removal or specific equipment changes)	$100,000
Total	$250,000
Optional reclaim equipment	$60,000
Total with reclaim equipment	$310,000

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Operating Costs Comparison

Component	Trivalent ($/Kamp/hr)	Trivalent with reclaim ($/Kamphr)	Hexavalent ($/Kamphr)
Chemistry	14.3	9.2	5.4
Anodes	0.03	0.03	1.6
Waste Treatment	0.3	0.03	4.6
Ion Exchange	0.2	0.2	-
Total	14.73	9.50	11.6

- Based on yearly costs at high throughput facility
- Excluding savings on reject parts

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Cost of Functional Trivalent

- Looking for additional data
  - Equipment and installation cost
  - Operating cost

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Proposed Amendment Concepts

New Facilities

- No new facility may use hexavalent chromium for the purposes of decorative chromium plating, hard chromium plating, or chromic acid anodizing
- A new facility is defined as any facility not operating a decorative chromium plating, hard chromium plating, or chromic acid anodizing line under District permit prior to the effective date of this rule

Existing Facilities

- Existing facilities to transition to non-hexavalent chromium alternatives
- Trivalent chromium is currently feasible for a wide range of applications
- Fugitive controls to address uncontrolled non-plating tanks and facility operations

Decorative Chrome Transition

- Decorative plating facilities to begin transition of hexavalent chromium within 2 years after the date of the amended ATCM or in 2024
- Transition to:
  - Trivalent chromium plating or
  - Other less toxic/lower emitting technology

Functional Chrome Transition

- Functional plating facilities to begin transition of hexavalent chromium within 4 years of the effective date of the amended ATCM or in 2026
- Transition to:
  - Trivalent chromium plating
  - Other less toxic/lower emitting technology

Housekeeping

- Use an approved cleaning method for all cleaning
  - wet mop, damp cloth, wet wash, low pressure spray nozzle, HEPA vacuum, or other method as approved by the Executive Officer
  - Clean spills within one hour after spill
  - Clean any area that may accumulate hex chrome weekly
- Remove any materials from walkways that can trap hex chrome – such as fabric carpets and rugs
- Clean buffing, grinding, polishing areas on days when buffing, grinding, polishing take place.

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Next Steps

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- Draft Regulatory Language – Late March 2021
- Initial Draft Staff Report – April 2021
- Working Group Meeting #4 – April 2021
- Health Risk Assessment – May 2021
- Economic Impact Assessment – May 2021

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