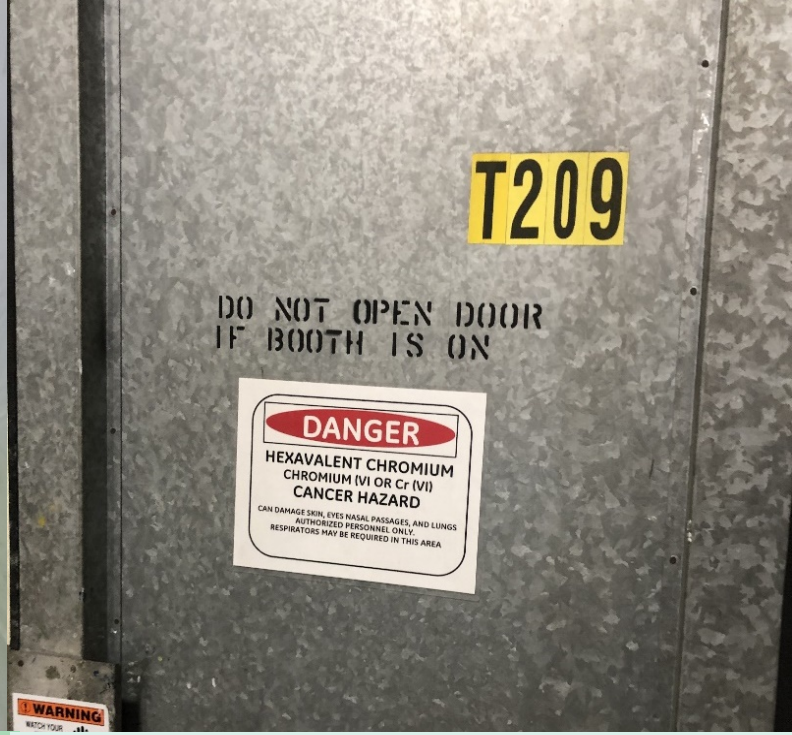


Proposed Amended Rule 1469.1 - Spraying Operations Using Coatings Containing Chromium

Working Group Meeting #4

September 9, 2020, at 10:00 AM

Zoom meeting link:

https://scaqmd.zoom.us/j/96782195264

Meeting ID: 967 8219 5264

Passcode: 543439

Dial-in: (669) 900-6833

Meeting Agenda

- Rule Amendment Process to Date
- Concepts for Parameter Monitoring Requirements
  - Open Face Velocity
  - Filter Face Velocity for Spray Booths
  - Filter Face Velocity for Bench Spray Booths
  - Velocity Measurements
  - Pressure Differential
- Next Steps

Rule Amendment Process to Date

Working Group Meeting #3 Summary July 22, 2020

- Initial recommendations for point source requirements
  - Maintain control device point source requirement
    - Clarify collection efficiency provisions
    - Require individual filter testing and certification by manufacturer
  - Remove annual emission limit and facility-wide cancer risk compliance options
- Introduced general concepts for:
  - Parameter monitoring of air pollution control equipment
  - Additional requirements for spray booths and coating-related operations

Overview of Rule Amendment Process for PAR 1469.1

Previous Meetings

Working Group Meeting #2
Housekeeping Concepts

Working Group Meeting #3
Point Source Requirements and Parameter Monitoring Concepts

Current Working Group Meeting #4

Spray Booth Parameter Monitoring

- Open Face Velocity
- Filter Face Velocity
- Demonstrating Velocity Requirements
- Pressure Differential

Future Meetings

- Parameter Monitoring Corrective Actions
- Additional Provisions for Spray Booths
- Requirements for Demasking and Coating Removal Operations
- Visual Monitoring

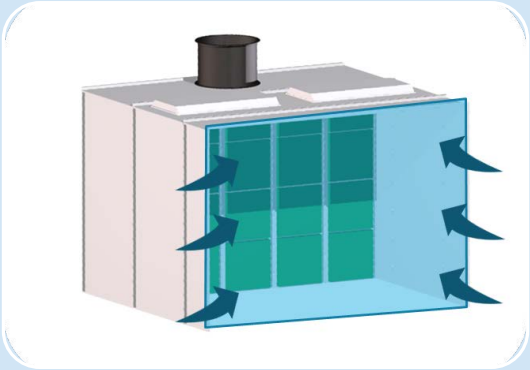
Present and Discuss Proposed Rule Language

Parameter Monitoring Concepts

Background

- Discussed at previous Working Group Meeting that source testing will not be required under PAR 1469.1 due to challenges with
  - Non-continuous operation
  - Varying types of chromate-based coatings used
- Emphasis on enhanced parameter monitoring to ensure proper operation of pollution controls and to minimize emissions at chromium spraying operations
- Monitoring key parameters of pollution controls can identify operational issues with air pollution control equipment
  - Can alert the operator of operational issues or needed maintenance on the pollution control equipment

Parameter Monitoring Areas of Focus



Open Face Velocity

Inward air velocity at the opening of an open face booth

Filter Face Velocity

Inward air velocity at the filter face of all spray booths

Differential Pressure

Differential pressure across filter media of all spray booths

Importance of Control and Collection Efficiency

Open Face Velocity

Filter Face Velocity

- In Working Group Meeting #2, staff proposed a point source requirement for spray booths of HEPA filters or better
- For point source controls, there are two critical elements:
  1. Control efficiency
  2. Collection efficiency
- HEPA filter requirement establishes the control efficiency
- Currently Rule 1469.1 does not include specific requirements for ensuring collection efficiency

Control Efficiency

- Establishes the percent control of the pollution control device
- HEPA filters have a 99.97% control efficiency

Collection Efficiency

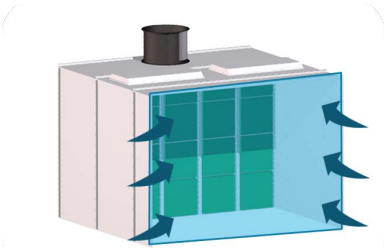
- Collection efficiency ensures pollution control device is collecting coating particles
- Low collection efficiency can lead to increased fugitive emissions

Spray Booth Collection Efficiency Requirement

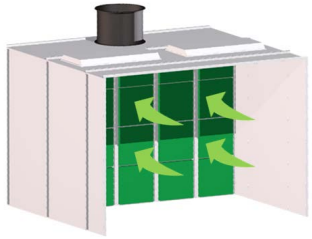
Open Face Velocity

Filter Face Velocity

- Collection efficiency ensures coating particles are directed towards the filters at an appropriate velocity
- Recently adopted or amended metal toxic rules require pollution controls be operated to meet the minimum standards in ACGIH Industrial Ventilation*
- To ensure that coating particles are being captured by the filters, air velocity can be measured at
  - Openings of open face booths; and
  - Filter face of all spray booths



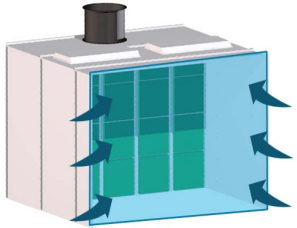
Spray booth open face



Filter face of spray booth

* "Industrial Ventilation, A Manual of Recommended Practice," published by the American Conference of Governmental Hygienists

Open Face Velocity



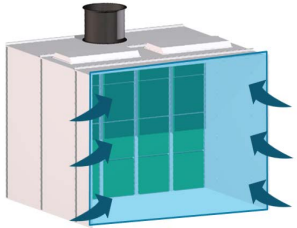
Background

- Open face velocity is the inward air velocity at the opening of an open face spray booth
- Operations conducted in booths with openings are more exposed to the surrounding environment than in enclosed spray booths
  - Coating particles can escape more easily through booth openings and become fugitive emissions
- Maintaining adequate air velocity at the opening can minimize fugitive emissions

From ACGIH Industrial Ventilation

Toxic materials in paint require higher air velocities at booth openings; does not reference a minimum velocity

Open Face Velocity



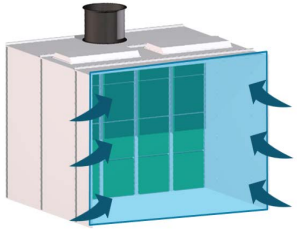
Current Rule Requirements

- Subparagraph (d)(1)(B)
  - Average inward face velocity of air through open face enclosure of 100 feet per minute (fpm), or other minimum velocity approved by Executive Officer

Facility not required to conduct periodic velocity monitoring

Average velocity means that some areas of the open face can be above and below 100 fpm

Open Face Velocity

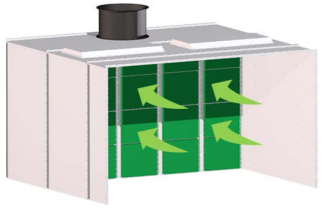


Initial Concepts

- Establish a minimum inward face velocity of 100 fpm at opening of spray booth
  - Does not apply to enclosed spray booths
  - Proposed requirement is more stringent than the current rule requirement for an average velocity of 100 fpm
- Require velocity testing every three months

Procedures for conducting velocity testing and proposed testing schedule discussed in later slides

Filter Face Velocity



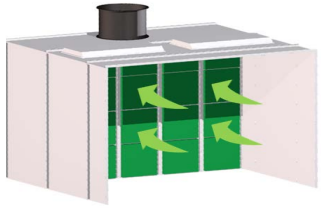
Background

- Filter face velocity is the inward air velocity measured at the filter face of a spray booth
- The velocity should be sufficient to draw air—and coating particles—to the filter face
  - Insufficient air flow to the pollution controls can result in additional fugitive emissions escaping through a booth opening or from coating particles being tracked out
- Too much air flow can interfere with the deposition of coating particles on parts and result in excess loading of filter media

From ACGIH Industrial Ventilation

Spray booth filters are typically rated for a filter face velocity of at least 100 fpm

Filter Face Velocity



Current Rule Requirements

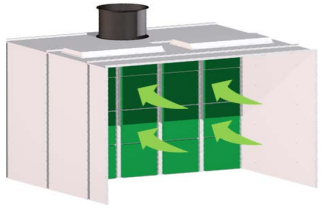
- Subparagraph (d)(1)(A)
  - Exhaust from spray enclosures ventilated to maintain continuous inward flow of air at all air openings during spraying operations

Does not specify the air velocity required at the filter face

Additional provisions will be added for filter face velocity for:

- Spray Booths
- Bench Spray Booths

Filter Face Velocity



Initial Concepts for Spray Booths

- Establish minimum air velocity of 150 fpm at the filter face for spray booths
  - Based on average filter face velocity of 40 permitted booths
  - Above the minimum recommendation of 100 fpm in ACGIH Industrial Ventilation for standard spray booths
- Require velocity testing every three months

Filter Face Velocity

Initial Concepts Bench Spray Booths –

- Establish separate minimum filter face velocity for bench spray booths
  - ACGIH Industrial Ventilation lists a higher velocity through bench spray booths than in other booths
- Establish minimum filter face velocity of 200 fpm
- Require velocity testing every three months

From ACGIH Industrial Ventilation

Small bench type booths have a velocity of 200 fpm through the booths

Demonstrating Air Velocity Requirements

Background

- Testing is proposed to measure the velocity of air flow for the open face and filter face to meet the requirements previously discussed
- The following slides describe initial concepts for
  - Testing method to measure both the open face and filter face velocities
  - Testing frequency
- Also providing alternative testing method to measure average filter face velocity
  - Can be used when difficult to access filter face(s) for direct velocity measurements

Demonstrating Air Velocity Requirements

Initial Concepts Measuring Tools

- Procedures for measuring open face and filter face velocities
  - Require use of anemometer to take 10 second readings at identified measurement points
- Anemometer with accuracy of ± 10% at full scale and operated/calibrated per manufacturers recommendations
- Require that operator
  - Maintain an anemometer on site; and
  - Calibrate anemometer annually per manufacturer's specifications

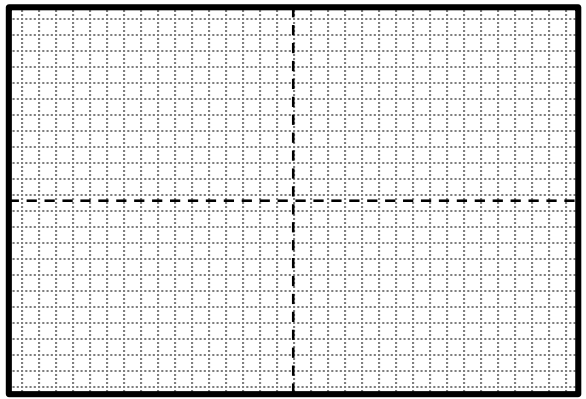
Demonstrating Air Velocity Requirements

Initial Concepts Measurement Method

- Method is the same for measuring open face velocity and direct measurements of filter face velocity
- Procedure for identifying velocity measurement points:
  - Divide the open or filter face into four quadrants
  - Take measurements at center of each quadrant and in the middle of the face
- Total of five measurement points for the open face and each filter face
  - Booths with more than one filter section should use this method for each section
- Each of the measurement points should be at or above the minimum velocity

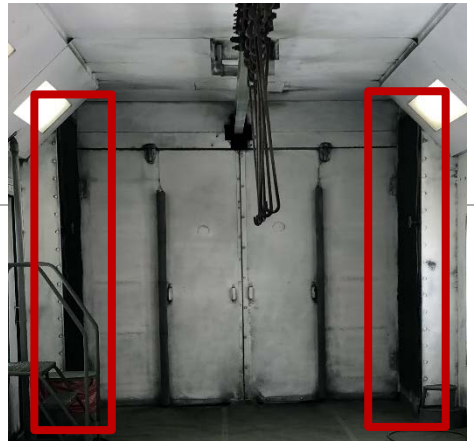
Examples of Measurement Points

Open or Filter Face

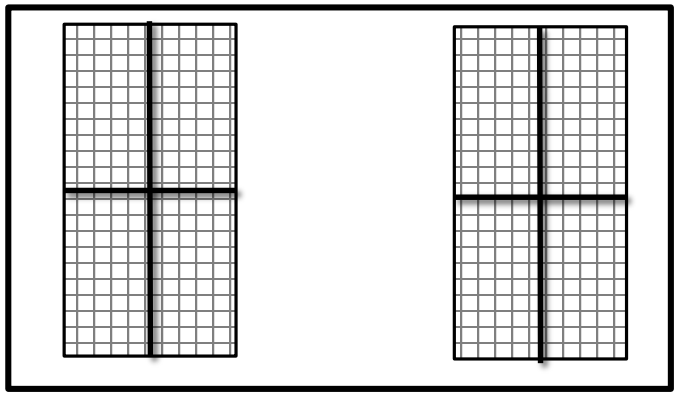


9 ft

12 ft



Two Filter Sections in a Spray Booth



= Measurement Point

Alternative Method for Demonstrating Air Velocity Requirements

Initial Concept for Alternative Filter Face Velocity Measurement

- Alternative method for spray booths that do not allow direct access to the filter face
- Proposed alternative method would calculate the average filter face velocity instead of directly measuring the filter face velocity
  - Calculations are based on duct velocity measurements and spray booth filter area
  - Requires anemometer probe to be inserted into access ports in the spray booth ducts

Alternative Method for Demonstrating Air Velocity Requirements

Equation for Alternative Filter Face Velocity Measurement

To determine the average filter face velocity ($\mathbf{V_f}$)

1) Using South Coast AQMD Method 1.1, take measurements at multiple traverse points with an anemometer to obtain the average duct velocity ($\mathbf{V_d}$) (More information on next slide)
2) Determine the area of the cross section of the duct ($\mathbf{A_d}$) where measurement was taken
3) Determine the area of the filter face ($\mathbf{A_f}$)

$$\mathbf{V_f = V_d \times A_d / A_f}$$

Where:

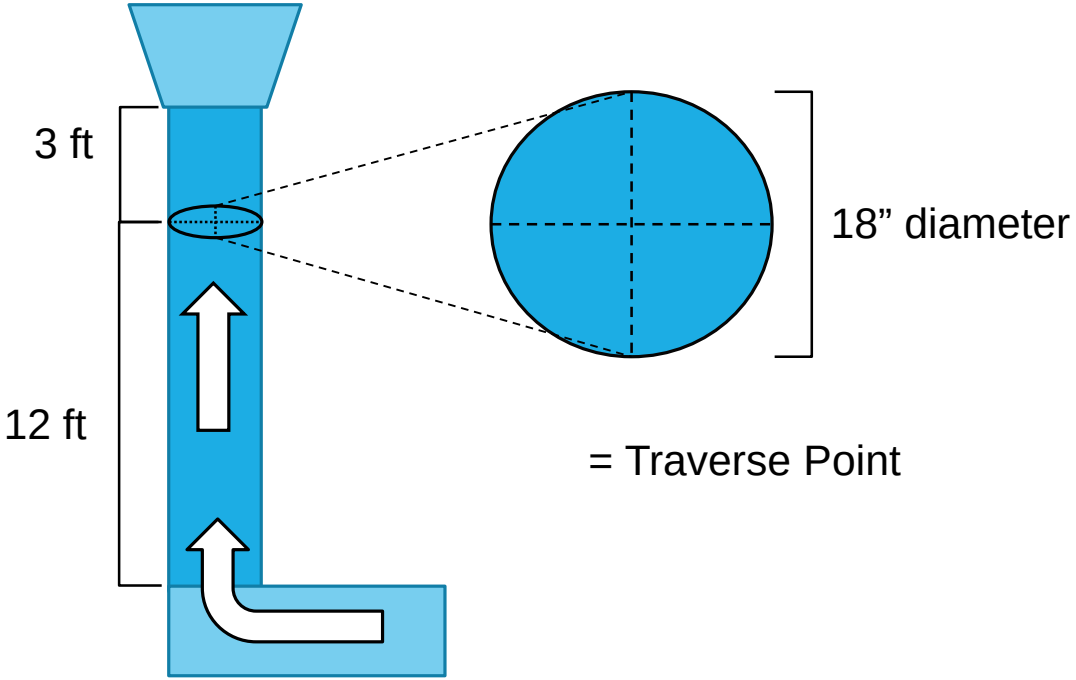
$\mathbf{V_f}$ = Average filter face velocity (fpm)

$\mathbf{V_d}$ = Average duct velocity (fpm)

$\mathbf{A_d}$ = Cross-sectional area of duct (ft^2)

$\mathbf{A_f}$ = Cross-sectional area of filter face (ft^2)

Example of Duct Measurement Site for Calculating (V_d)



Example of duct measurement site with traverse points

- Method 1.1 specifies the location of duct measurements and number of traverse points
- Minimum of eight traverse points required
- Number of traverse points are dependent on
  - Duct diameter
  - Distances between upstream and downstream disturbances, ideally
    - 8x length of diameter downstream
    - 2x length of diameter upstream

Testing Frequency

Initial Concepts

- Conduct initial velocity test measurements within six months of rule amendment adoption
  - If pass, continue testing every three months
  - If cannot meet minimum velocity, require operator to meet a compliance schedule for corrective actions
- Compliance schedule for corrective actions will be discussed at the next Working Group Meeting

Pressure Differential Monitoring

Background

- Minimum pressure differential, in conjunction with the maximum pressure differential, provides indication of filter performance
  - Filters that are clogged will not allow proper airflow through the exhaust system and reduce the ability to capture coating particles (pressure increase)
  - Filters that are torn or not seated properly will allow coating particles to escape through the exhaust (pressure drop)

Differential Pressure

Differential pressure across filter media of all spray booths

Pressure Differential Monitoring

Current Rule Requirements

- Paragraph (k)(2) requires
  - Pressure gauge to be installed to continuously monitor the pressure differential across filters
    - Device used to monitor pollutant loading
  - Maximum pressure differential established by permit conditions, or manufacturers specifications if not established by permit
- Subparagraph (j)(2)(D) requires the pressure differential to be recorded once per week for any week in which spraying is conducted

Maximum pressure differential does not indicate if filters have leaks

More frequent monitoring can provide early notification of potential issues

Pressure Differential Monitoring

Initial Concepts

- Maintain limits on maximum pressure differential
- Establish minimum pressure differential limit to monitor filter integrity
  - Based on the filter manufacturers' specifications
- Maintain filter specification documents onsite
  - If filters are exchanged for another model, maintain documents for previous filters onsite for three years
- One year after rule amendment, require continuous recording of pressure differential data
  - Staff will be developing a standardized format for recording pressure differential data
- If pressure differential measurements are outside of minimum or maximum limits, require operator to meet a compliance schedule for corrective actions
- Compliance schedule for corrective actions will be discussed at the next Working Group Meeting

Parameter Monitoring Summary

Open Face Velocity	Filter Face Velocity for Spray Booths	Filter Face Velocity for Bench Spray Booths
• Minimum velocity of 100 fpm • Take readings every 3 months • Applies to open-faced booths	• Minimum velocity of 150 fpm • Take readings every 3 months • Applies to all spray booths, except for bench spray booths	• Minimum velocity of 200 fpm • Take readings every 3 months

Pressure Differential Monitoring
• Maintain maximum limits and establish minimum limits • Keep filter specification documents onsite • Continuously monitor and record pressure differential

Next Steps

Next Steps

Working Group #5

- Parameter Monitoring Corrective Actions and Compliance Schedule
- Additional Provisions for Spray Booths
- Requirements for Demasking and Coating Removal Operations
- Visual Monitoring

Present proposed rule language

Governing Board Meeting – First Quarter 2021

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