



HEXAVALENT CHROMIUM OSHA MONITORING GUIDANCE FOR COMPLIANCE

On February 28, 2006 the Occupational Safety and Health Administration (OSHA) issued a standard that significantly lowered the limit on worker exposures to hexavalent chromium (Cr(VI)). This new standard greatly increases the monitoring, training and hygiene requirements for facilities with industrial processes that use Cr(VI), even in small quantities and/or concentrations. These processes include, but are not limited to:

- Chromium Electroplating
- Chromic Acid Passivation
- Hexavalent Chromium Conversion Coating
- Chromic Acid Etching
- Chromic Acid Sealing of Anodized and Phosphated Parts
- Painting with Chromium Based pigments
- Wastewater Treatment of Hexavalent Chromium Containing Rinsewaters
- Welding of stainless steel

OSHA's new standard requires that facilities with Cr(VI) monitor employee exposures. During the initial compliance assessment period, all job tasks that may have exposures greater than $0.5 \mu\text{g}/\text{m}^3$ must be evaluated. These job tasks include, but are not limited to:

- Metal Finishing Operations (i.e., operators, un/rackers, supervisors)
- Quality Control Monitoring and Chemical Additions (lab techs)

- Periodic tasks such as tank clean-out, liner replacement (maintenance staff)
- Wastewater treatment of Cr(VI)-containing process water & concentrates (treatment operators)

General Requirements:

If hexavalent chromium is used in the workplace, the employer must monitor employee exposure to Cr(VI) to determine if any employee is being exposed to Cr(VI) in excess of the PEL: $5 \mu\text{g}/\text{m}^3$, as an 8-hour time-weighted average (TWA). Employers are required to conduct initial monitoring of airborne Cr(VI) concentrations and to conduct periodic exposure monitoring for all tasks where employee exposures are above the action level ($2.5 \mu\text{g}/\text{m}^3$, as an 8-hour TWA).

The method to be followed for air sampling and analysis is OSHA Method 215 (available through OSHA's web site at www.osha.gov). This validated method meets the +/-25% accuracy and precision requirements of the standard. Facilities can conduct their own sampling provided that they use the proper sampling equipment, filter media and follow the method. During this sampling, a small calibrated pump is worn on the belt of the operator and is used to draw a representative air sample from the breathing zone of the employee and collected on a filter. An accredited laboratory with an outside approved quality control program is to be used for analysis of the filter for Cr(VI) using ion chromatography equipped with a UV-vis detector. The testing is recommended sampling time is eight hours.

Initial Monitoring:

- Employers with less than 20 employees were to provide initial monitoring by May 30, 2007.
- All other employers must provide initial monitoring by November 27, 2006.
- When a new Cr(VI) exposure is introduced into the workplace.

Initial monitoring is not necessary if:

- Objective data, representing the highest Cr(VI) exposure likely to occur during processing, use, or handling, show that Cr(VI) cannot be released in concentrations above the action level;
- Employee exposure monitoring was performed within 12 months prior to May 30, 2006, which satisfies the monitoring requirements and was conducted under conditions substantially equivalent to existing conditions;

Periodic Monitoring:

If initial monitoring shows employee exposures are at or above the action level, employers must perform periodic 8-hour TWA monitoring as follows:

- Every six months if initial TWA monitoring results are at or above the action level but at or below the TWA PEL.
- Every three months if initial TWA monitoring results are above the TWA PEL.
- Periodic 8-hour TWA monitoring is not required if initial TWA monitoring results

are below the action level (AL). However, in order to verify this, two consecutive measurements, **taken at least 7 days apart**, must show that exposure levels are below the action level. After that, employers may discontinue the monitoring requirements accordingly.

Additional Monitoring:

Employers must perform additional monitoring if there is an indication that employee exposures have increased. Changes in production that may trigger additional monitoring include process chemistry changes, equipment changes, control equipment, or work practices that could increase exposure levels; and leaks, ruptures, or other equipment breakdowns.

Monitoring Specifications:

In determining each employee's workplace exposure to Cr(VI), employers may take either:

- Personal breathing zone air samples for each employee exposed; or
- Personal breathing zone air samples for one or more employees when the samples are representative of each employee's exposure, provided that sampling is conducted under the highest potential exposure.

- Area monitoring is not an acceptable method for determining PEL compliance.

Personal breathing zone air samples are considered representative of an employee's 8-hour TWA if:

- The employee(s) sampled are in the same job classification
- The employee(s) sampled are working in the same area
- The employee(s) sampled work during the same work shift (if the employer can document that tasks and workplace conditions are similar during all work shifts, he/she only needs to determine the exposure level for one work shift).
- The employee(s) sampled is expected to have the highest Cr(VI) exposures of all employees in the group of employees represented by the samples collected.

OSHA ID-215 monitoring method requires that the sampling device must be calibrated in-line (through the air filter media being used) for each monitor. The flow rate through each monitor must be 2 Liters per minute (LPM). The air sampling media to be used is a 37 mm PVC filter badge, which is typically clipped to an operator collar and placed near his/her breathing zone. An approved primary calibration (e.g., not a field rotameter) instrument must be used to verify the flow rate of 2 LPM through each filter. At least one (1) blank (unused) cassette must be submitted for each lot of filters to be analyzed.

Before placing the monitor on the employee, explain why they are being tested. Indicate that they will be notified of the test results when they are available to the employer. The employees should be instructed not to touch or remove the monitor at any time during the testing. They should wear the monitor during breaks and lunch periods. It is recommended that sampling be conducted for a full work shift. At a minimum, at least seven (7) hours for each operator should be tested. For example, a maintenance operator may only have 30 minutes of exposure to chromic acid, but the monitor should be worn for the full work shift.

Employee Notification of Monitoring Results:

Employers are required to notify employees of all monitoring results, in writing, within

15 working days of receiving the results. If exposures are above the PEL or action level, the employer must inform the employee of the corrective actions being taken (i.e., changes to engineering controls, work practices, etc.). Results can be posted on a company bulletin board or provided in writing to the individual workers affected.

OSHA's standard requires employers to allow affected employees or their designated representatives to observe any monitoring activities. Where such observations involve entry into areas where personal protective equipment (PPE) is necessary, the employer must provide and ensure the use of the appropriate PPE. In addition, the employer must ensure that observers follow all other applicable safety and health procedures.

Recordkeeping:

Employers must establish and keep accurate records of all exposure monitoring data as well as the objective data used to support exemptions from initial monitoring requirements.

a) Exposure Monitoring Data:

Employers must keep exposure monitoring records for 30 years. The records must include:

- Date of the measurement for each sample taken;
- Monitored operation involving Cr(VI) exposure;
- Sampling and analytical methods used and evidence of accuracy by lab.
- Number, duration, and results of samples taken.
- Worker name, job classification, and exposure levels (where representative samples are used, identify all employees represented by the data and indicate which employees were above the action level and PEL).
- Additional helpful general process information to include is type of metal finishing process (e.g., hard chromium plating), the type of equipment (manual, automatic hoist, etc.) and the type of ventilation (bilateral,

push-pull, enclosed hood, etc.)

(NOTE: this guidance provides only general information on air monitoring requirements and should not be considered to be a complete summary of the Cr(VI)-related monitoring requirements. For specific exposure monitoring requirements, please refer to the OSHA Cr(VI) standard Title 29 of the Code of Federal Regulations, Part 1910.1026. The standard can be accessed at OSHA's web site www.osha.gov.