

MIOSHA Fact Sheet



Chromium (VI)

What is chromium (VI) [hexavalent chromium or Cr(VI)]?

Cr(VI) is one of the chemical states of the element chromium (Cr). Cr(VI) forms chemical compounds that are colorful. Cr(VI) compounds may be used as pigments in dyes, paints, inks, and plastics. They may also be used as an anticorrosive agent in paints, primers, and other surface coatings. The Cr(VI) compound chromic acid is used to electroplate chromium onto metal parts to provide a silvery decorative or protective coating.

How can Cr(VI) affect the body?

Adverse health effects associated with Cr(VI) exposure include occupational asthma, eye irritation and damage, perforation of the nasal septum and eardrums, respiratory irritation, kidney damage, liver damage, pulmonary congestion and edema, upper abdominal pain, nose irritation and damage, respiratory cancer, skin irritation, and erosion and discoloration of the teeth. Some workers can also develop an allergic skin reaction called allergic contact dermatitis. Contact with non-intact skin can lead to ulceration of the skin referred to as chrome ulcers.

Where can exposure to Cr(VI) occur?

Occupational exposure to Cr(VI) can occur from inhalation of dusts, mists, or fumes containing Cr(VI) or from eye or skin contact with the substance. Operations or processes associated with occupational exposure to Cr(VI) include:

- Electroplating
- Welding
- Automotive painting
- Chromated copper arsenate (CCA) production
- Paint and coating production
- Printing and ink production

- Plastic colorant production and usage
- Plating mixture production
- Steel mills
- Iron and steel foundries
- Printing
- Woodworking
- Construction

Is employee exposure to Cr(VI) regulated?

Construction Safety and Health Standard [Part 604. Chromium \(VI\) in Construction](#) regulates employee exposure to Cr(VI) in construction and General Industry Safety and Health Standard [Part 315. Chromium \(VI\) in General Industry](#) regulates Cr(VI) exposure in general industry. Unless otherwise stated, the following requirements apply to both construction and general industry:

- **Exposure determination.** The employer must determine each employee's 8-hour, time weighted average (TWA) exposure to Cr(VI). Monitoring results must be compared to the permissible exposure limit (PEL) of 5 micrograms per cubic meter of air (5 ug/m³) and the action level of 2.5 ug/m³.
- **Regulated areas.** In general industry only, the employer must establish a regulated area wherever an employee's exposure is or can be expected to be in excess of the PEL.
- **Methods of compliance.** The employer must reduce employee exposure to Cr(VI) to at or below the PEL by the use of engineering and work practice controls unless the employer can show that such controls are not feasible. Also, if the employer can show that an employee is not exposed to Cr(VI) above the PEL for more than 30 days a year, then the requirements to

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implement engineering and work practice controls do not apply.

- **Respiratory Protection.** The employer must provide respiratory protection when employees are exposed above the PEL. Respiratory protection cannot be substituted for feasible engineering or work practice controls. A respiratory protection program must be developed and implemented in accordance with General Industry and Construction Safety and Health Standard [Part 451. Respiratory Protection](#) (Part 451). Part 451 applies when employers allow or require the use of respirators.
- **Protective work clothing and equipment.** Where a hazard is present or is likely to be present from skin or eye contact with Cr(VI), the employer must provide appropriate personal protective clothing and equipment at no cost to employees and must ensure that employees use such clothing and equipment. Employees must not remove contaminated clothing from the workplace, and the employer is responsible for cleaning and laundering contaminated clothing and equipment.
- **Hygiene areas and practices.** Where protective clothing and equipment is required, the employer must provide change rooms with separate storage facilities for protective clothing and equipment and for street clothes. Washing facilities must also be provided. Certain activities such as eating and smoking are prohibited in the exposure area.
- **Housekeeping.** The employer must ensure that eating and drinking areas and surfaces are maintained as free as practicable of Cr(VI). In general industry, HEPA-filter vacuuming is required for the cleaning of surfaces, and the use of compressed air and dry sweeping methods are prohibited.

- **Medical surveillance.** The employer must make medical surveillance available at no cost to the employee, and at a reasonable time and place, for all employees who are:
 - Exposed to Cr(VI) at or above the action level for 30 or more days a year,
 - Experiencing signs or symptoms of the adverse health effects associated with Cr(VI) exposure, or
 - Exposed to Cr(VI) in an emergency.
- **Communication of hazards.** In addition to all requirements of General Industry Safety and Health Standard [Part 430. Hazard Communication](#), the employer must ensure that each employee be able to demonstrate knowledge of at least the following:
 - The contents of the Cr(VI) standard,
 - The purpose and description of the medical surveillance program, and
 - The specific health effects of exposure to Cr(VI).

In addition, the standard must be readily available to all affected employees.

- **Recordkeeping.** Records must be kept of all air monitoring and any objective data relied upon to meet the standard's requirements such as information about materials (e.g., safety data sheets), operations, processes, etc. for 30 years. Employee medical surveillance records must be maintained for the duration of employment plus 30 years.

Additional information

Please visit the MIOSHA website at www.michigan.gov/mioshapublications where additional information may be available, or contact the Consultation Education and Training Division at (517) 284-7720.